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Battelle Technical Review

VOLUME 4, NUMBER 1

IN THIS ISSUE:

Man and Machine

PHYSICAL METALLURGIST

ALBERT M. HALL

A vast gulf often separates the need or desire for a metal or alloy and its commercial application. A primary concern of Albert M. Hall is bridging that gulf and thus shortening the time between development of a material in the laboratory and application of it in commercial practice.

Al believes that the way to speed up progress in the development of metals and alloys is to use a fundamental approach where possible and to combine it with the teachings of experience. As our knowledge of the fundamentals of metals and alloys increases, the task becomes somewhat easier.

Al has been concerned with such varied problems as the development of electrical resistance alloys; stainless-type casting alloys for all kinds of applications at temperatures from 1000 to 2200 F; nickel-, copper-, chromium-, and iron-base alloys for many uses; high-temperature application of metals; and methods of metal fabrication—including forging, rolling, drawing, extrusion, and extrusion cladding. In their work, Al and his group never lose sight of the fact that the progress of metallurgy depends heavily on developing techniques that can be passed on easily to the technical and operating personnel of producers.

Before joining Battelle in January, 1945, Al had served as a research metallurgist at the Huntington Works of the International Nickel Company. There he specialized in metallography and set up a metallographic laboratory. Earlier, he had received three degrees from Columbia University—A.B., B.S. in metallurgy, and M.S. in metallurgy.

In addition to articles on various phases of his work, Al is author of *Nickel in Iron and Steel,* in the Alloys of Iron Research Monograph Series. The monograph has just been published by John Wiley and Sons.

Three sons, aged 13, 11, and 8, help to keep Al busy at home, although he manages to find time for his hobbies of wood and metal working.

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contents

Physical Metallurgist . . . . Inside front cover

Research Investment 1

An Editorial

Diminutive Devices 2

Man and Machine 3

by D. T. WILLIAMS

Research on the human being in his relationship to machines is needed to make the man-machine partnership more effective.

Science and Farm Surpluses 9

by K. STARR CHESTER

Science and technology can aid agriculture by helping to solve the problem of surpluses. New industrial crops and new uses for surplus crops and farm wastes are profitable areas of research.

Notes From Battelle 11

Reports on research activities and developments of interest to science and industry.

Writings by Staff Members . . Opposite page 12

Papers and articles prepared by members of the Battelle staff that have appeared recently in books and periodicals.

Battelle Technical Review Abstracts 1a

Abstracts of articles from more than 1100 American and foreign journals in a wide variety of technological fields.

Research Investment

APPLIED RESEARCH TODAY, unlike that of a half-century ago, is regarded by industry as an investment. It is supported not out of curiosity, not out of patronage, but for the sole purpose of helping the business. It fails, in the business sense, if it does not produce results.

In a very real way, an investment in research may be likened to an investment made by a banking firm. And the research manager, if he is doing the highest service to his company, will approach research planning in the same way a banker approaches an investment in loans or in securities.

In banking, the officer passing on the loan appraises the chances of a reasonable return. He studies his problem objectively and unemotionally. Similarly, a good research manager evaluates the chances of a reasonable return from the capital to be invested. He, too, is objective and has evidence to support the economic and technical soundness of the proposed project. He is not swayed by hunches or emotional attachments.

Quite often a number of possible outlets are open to a banker. His problem, then, may be to select the most promising investments, and he may wish to diversify them to provide additional protection. In the same way, a research manager must make a choice among various likely projects. He, too, considers how distribution of funds will best protect the company's welfare.

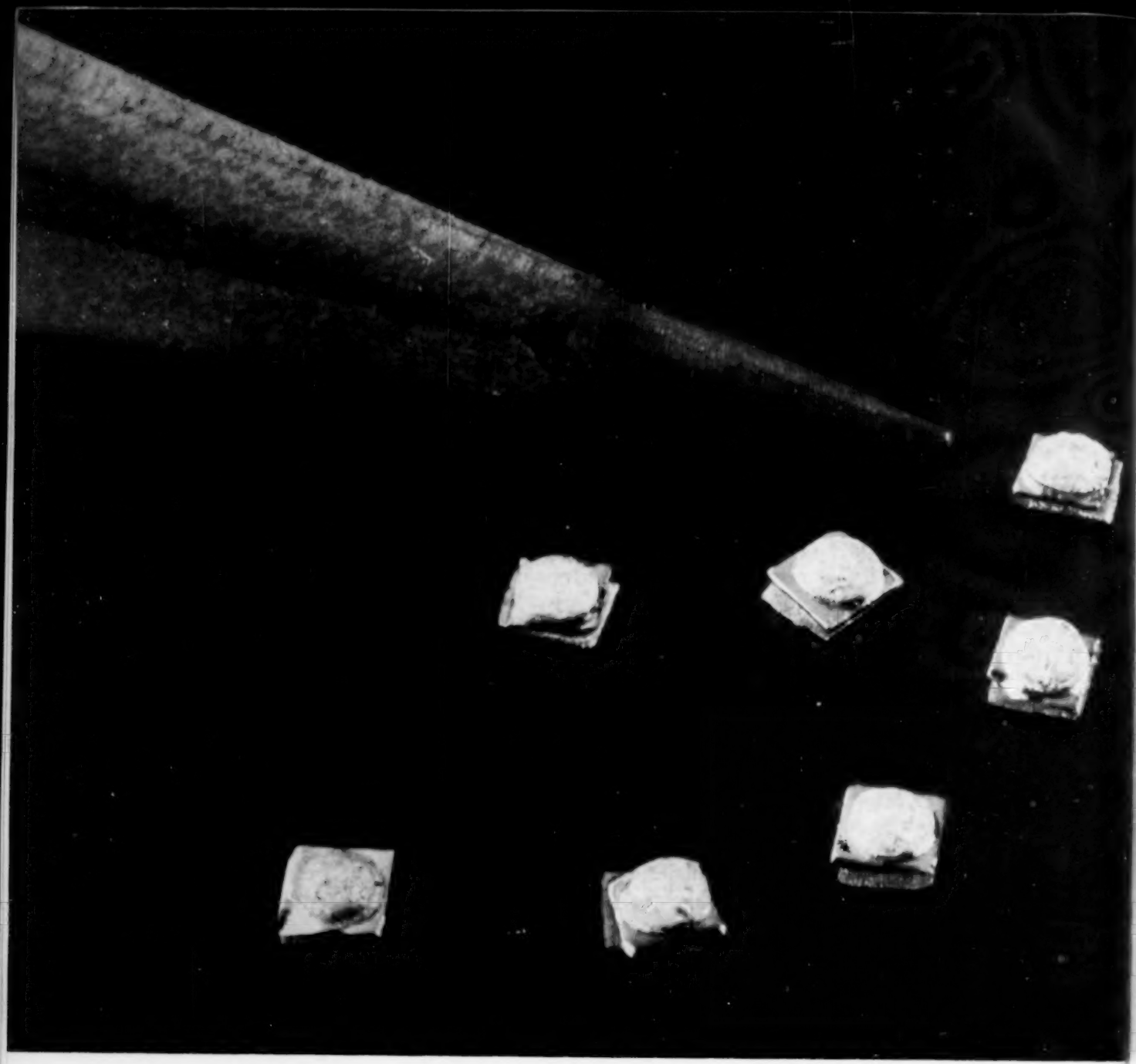
A banker does not confine his inquiry to the positive factors alone. He evaluates collateral and tries to determine what could be salvaged should the investment fail. In the same manner, a realistic research manager asks himself what could be salvaged if the study fails to yield the desired results. Even negative research data have value, but it is up to the research manager to decide whether his company can afford to pay for negative data. A project which promises a lucrative return if fully successful, and the chance of lesser return if not completely successful, is obviously a safer bet than one that promises "blue skies" alone.

The banker and the research manager, alike, must be good judges of men. Underlying the success of all enterprises is intelligence and human integrity. An ability to evaluate these qualities—to know when the personalities involved are prime factors—is a priceless asset for both the banker and the research manager.

Research managers, like bankers, have strong moral obligations to those they serve. The research manager's decisions, like those of the banker, involve far more than his own reputation and economic welfare. They involve the welfare of all stockholders and employees. He who plans investments in research, like he who plans investments in commercial enterprises, has a position of trust—requiring a keen sense of personal responsibility and a high order of business acumen.

Clyde Williams

President and Director, Battelle Memorial Institute



DIMINUTIVE DEVICES

These tiny specks of metal, their size indicated by the pencil point, are electronic rectifiers for converting alternating to direct current. They were prepared at Battelle by fusing disks of indium, about four-hundredths of an inch in diameter, on wafers of germanium. The exacting process must be carried on in a controlled atmosphere. Small as they are, these devices can perform many jobs done by vacuum tubes. Circuits combining the rectifiers with transistors can operate for months on small batteries.

Man and Machine

Research on the human being in his relationship to machines is needed to make the man-machine partnership more effective.

by D. T. Williams

Some thirty years ago there was a fire in a building at Hiram College in Ohio. The students, in great glee, brought out the old-fashioned hose cart, and began running with it toward the fire; one young fellow, to pull more effectively, got between the shafts and put his shoulder to the crosspiece that joined them at the front. All went well until the cart reached the crest of a hill and began to roll down toward the blazing building. As the vehicle gained momentum, one by one the students who could do so, let go. Only the poor chap between the shafts could not; he ran as man has never run before or since, with strides that increased like a kangaroo's leaps. The faster the cart rolled, the faster he ran until at the bottom of the hill he finally got out of his predicament, exhausted and much enlightened.

Man, in the course of the Technological Revolution, finds himself in a position much like that of the eager student. The machines man is continually inventing, and which he once operated with ease and effectiveness, sometimes tend now to get out of hand.

Continued advance in technology tends, at various points, to be limited by the characteristics of man himself; specifically, mechanical devices often can do more, faster, than the operator can apprehend and control. When this happens, there is a limitation on what the machine can do, imposed by the operator's limitations.

The designer and manufacturer of machinery, whether for production of goods, or for transportation, is in an especially sensitive position in this connection. It is possible for one company, for example, to increase the accident rate on the highways by a single ill-advised change in automobile performance.

Dr. Williams has been active in the application of physics to engineering problems, including studies in photoconductivity, reactor technology, and minerals processing. Before joining Battelle in 1945, he served as a physicist with the National Advisory Committee for Aeronautics in Cleveland. Among his other activities, while with the NACA, Dr. Williams prepared one of the early studies on jet propulsion (in which he suggested using the ducted propeller) and investigated the effect of turbulence on flames. In addition to articles on aeronautical and other subjects, he is coauthor of a forthcoming textbook, *Fundamentals of Biological and Medical Physics.*"

Man as a Servomechanism

An author of a recent popular book describing computing machines has pointed out how "human" a large computer is, in certain types of abnormal behavior. It is worth while reciprocally, to point out some characteristics of human beings that are machinelike, in order to understand more clearly the interrelation of the machine and its human operators.

This relationship can be seen in the operation of a complex mechanism such as an aircraft. The machinelike characteristics of man are evident when a pilot flies contact. He watches the horizon to maintain level flight: his glance at the horizon is a stimulus —or, let us say, an "error signal". If a wing is low, the pilot rapidly responds; his "output" is a movement of the stick. The aircraft rights itself so that the horizon appears level to the pilot, and the cycle is closed as the stick is brought back to zero.

Every act of flying can be analyzed similarly. Typical stimuli are the map, the terrain, the altimeter, the fuel gauge, or the air speed meter. Typical responses are movements of the stick, and the throttle.

As a matter of fact, the group of "mechanisms" that includes the aircraft, its controls, and the pilot is, in engineering terms, a "feed-back control system". The mechanisms together control flight by means of a closed loop of responses that includes a "feed-back" means of determining how adequate the control pro-

cedures are. Because a part of this "feed-back control system" is mechanical, it may also be referred to as a "servomechanism."

All servomechanisms have two characteristics. They are (a) "error actuated" and (b) "mechanical amplifiers". This means that they have some provision for detecting an error, and for signaling need for the operation of a control to correct it. Moreover, servomechanisms can be activated by a small signal to set in motion a large mechanical force to operate the required control.

The pilot-control-aircraft system may also be thought of as a pair of servomechanisms, each one of which itself has the same fundamental properties. The *human* servo in the chain detects "errors" in the form of visual signals, such as readings on an instrument and "actuates" the control levers of the aircraft. The *mechanical* servo, detects the movements of the control levers as the stimulus of that link in the servo system; the maneuvers of the aircraft are the final "output" of the link. The readings on the dials of the instrument panel reporting the nature of the maneuvers are the part of the "feed-back" that closes the loop. The accompanying diagram illustrates this point of view, for one type of aircraft maneuver.

Fitting the Machine to the Human Servo

After the stimulus has been detected in any servomechanism, there is normally a delay time during which the reaction takes place. In mechanical servo links, this time may be devoted mainly to accelerating and moving heavy machine parts. Again, the delay time may be spent principally in reviewing a "memory" to choose the right response. The human link does both.

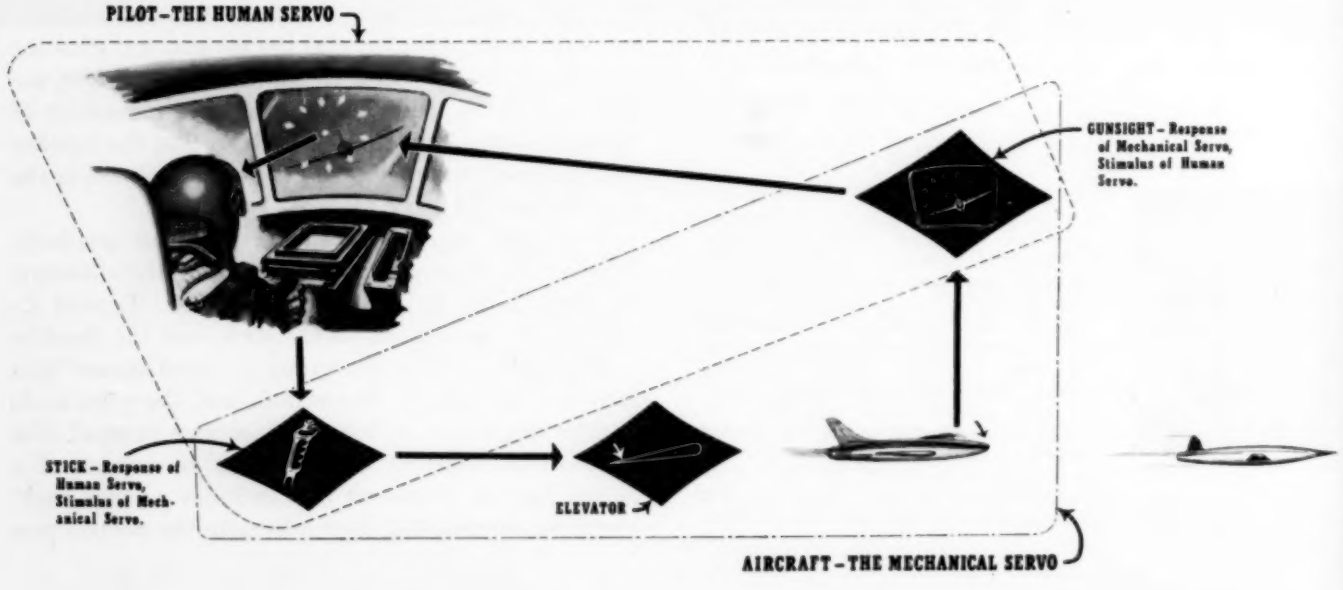
Any servomechanism, of which a human operator is a part, will operate efficiently only if the various parts of the mechanism are properly matched, and if the parts are separately efficient. In particular, the delay periods of the different servo links should be quite different for proper operation. Certain common characteristics of servo systems can be understood by considering common experiences on the highway.

A driver often finds he has to adjust the steering more or less continually to keep his car on the road—a process called "hunting". The car "hunts" because the error signal that prompts the driver to correct his course may be so small that the driver needs a little time to see whether he is tending to drift out of his lane. The effect is somewhat more noticeable if there is a little "backlash" in the steering mechanism. Both causes of hunting are the same, it is referred to as a "dead zone" in the servo control.

Sometimes the "dead zone" is especially large, as when the driver is not completely sober, and therefore somewhat insensitive. In such cases, the amplitude of the hunting maneuver is large—the car swerves from one side of the road to the other.

The same kind of exaggerated response is sometimes observed with an inexperienced driver, who "overcorrects" the error of his machine. A mechanical servomechanism can similarly overcorrect. In order to avoid such a malfunction, the nature of the response may

HUMAN AND MECHANICAL SERVO LOOPS


PILOT–THE HUMAN SERVO
GUNSIGHT – Response of Mechanical Servo, Stimulus of Human Servo.
STICK – Response of Human Servo, Stimulus of Mechanical Servo.
ELEVATOR
AIRCRAFT – THE MECHANICAL SERVO

be adjusted in a servomechanism so that the response is proportional to the error signal; and it may further be made "proportional plus rate"—that is, adjusted so that the correction may be less when the rate of increase of the error is less. A seasoned driver adjusts his response automatically, in much the same way, so that, for example, when the car is moving fast, and nearly straight, his response is much smaller for a given error signal than when the car is going slow. An important part of this automatic change in response is due to the "feel" of the wheel at different speeds. When a motor car designer builds a power steering device, he must make certain that it will not entirely eliminate this important part of the error signal.

Again, because he is distracted by an interesting object alongside the road, by noises from within the car, or by remarks from the back seat, a driver may function poorly as a servomechanism. Mechanical servo systems are subject to the same source of trouble —it is, logically enough, referred to as "noise".

Research on the Human Being as a Mechanism

It has been recognized for many decades that human beings can be analyzed as mechanisms with considerable profit. Such analyses fall naturally into three different categories—studies of human beings as (a) psychological entities; (b) mechanical devices; and (c) servomechanisms.

The first study treats man, his emotional stability and integrity, as a subject of research; it analyzes the stimuli that influence his stability and the pattern of behavior that results under various types of emotional stress. This subject is a fascinating one, but it will not be discussed here. The second relates to human beings as they perform in routine assembly line production. The function demanded of the human in this connection is limited to simple manipulations generally involving a minimum of intelligent choice or judgment. Brief mention will be made of the current state of this field of science, mainly to outline its scope. The third type of study relates to human performance as a control mechanism, acting only on demand as required by the machine being controlled. This subject will be considered more at length, as having the greatest present interest.

The study of the human being as a mechanical device began early in the century in this country, in connection with time and motion studies. Workers in an assembly line can be observed by a trained industrial engineer and the economy of their hand or body motions evaluated. Often a high-speed motion picture of a man assembling a complicated piece of apparatus, for example, can reveal enough to the trained observer to permit a revision of the conditions of work which may greatly reduce fatigue and increase output.

The third category may be exemplified by recent study of the efficiency of the pilot of an aircraft. The urgency of this subject hardly needs to be emphasized. The complexity of the instrument panel that any plane passenger can see in the pilot's cockpit, speaks for itself. The Air Force has already built up an impressive list of accomplishments in its investigations in the field of pilot efficiency. Other agencies in the armed forces are using the rapidly expanding knowledge of applied experimental psychology in the solution of their own military problems, and the end is not in sight.

For example, experimental psychologists have analyzed the sensitivity of the human servo to various types of stimuli. Thus, the work on visual acuity has been specialized in the direction of improving the design of aircraft dials in such matters as arrangement, shape, size, and color of lettering.

A problem of unusual interest was the work done on the altimeter. This device has to tell the pilot his altitude within about 10 feet; and it has to work over a range of as much as 40,000 feet or more. The dial used to have three pointers, one for tens of thousands, one for thousands, and one for tens of feet. The illustration on the next page shows this and other types of altimeter dials. Undoubtedly, many accidents have occurred through the misreading of dials. Experiments by psychologists have established that mistakes in reading dials of the type shown on the left in the illustration are extremely probable. There are also many cases in practice where the same type of mistake has actually been made; and some airplane crashes are suspected, without possibility of definite proof, to have been caused by a 1000-foot error in reading the altimeter.

Other dials in the illustration show how a scale may be improved to eliminate such errors by taking account of the preference of the human dial-reader. The dials shown were tried out on a number of pilots and college students; the bar graphs under each dial indicate errors in per cent and interpretation time in seconds.

Studies have been directed to improving the arrangement of the great number of dials in the cockpit, locating the various control knobs so they can be more easily reached, and changing the knob shape so that the pilot can identify the levers by touch. In still another area, a good deal of knowledge has been accumulated relating to the effectiveness of tonal

signaling systems in terms of loudness, frequency, and duration, both with and without interference.

Mechanical Characteristics of the Human Servo

A servo link, upon receiving a signal, makes a mechanical response. Therefore, much study has been devoted to the mechanical characteristics of the human servo link.

A common response of a human servo link is a simple motion of a crank or lever, or a twist of a knob to set a pointer on a specified mark on a scale. This type of task is simple, but it is often very important that it should be accurate and rapid, especially when piloting a high-speed aircraft. Accordingly, studies have been made of the ease and accuracy of typical motions.

One result of these studies was the conclusion that control knobs can be located most advantageously in front and immediately to the side of the operator if they are to be reached without looking and without fumbling. This conclusion may seem fairly obvious; yet, many aircraft controls were at one time located very unfavorably. Another fact, demonstrated in the same type of study, was that the strength of the hand or arm varies substantially with the location and direction of the required motion. Often controls are "stiff" or "light" at different locations in their travel. The servo engineer may be called upon to change the "feel" of the control so as to make its operation uniformly easy and accurate.

Studies were also made on the design of controls for maximum speed. In one experiment, the maximum speed of a hand-operated hand crank was tested as a function of the radius of travel of the crank and of the torque against which the crank turns. Data indicated that a crank turning around with a 4-cm radius can be rotated most rapidly, more or less regardless of the load, up to about a 2-pound load on the crank handle.

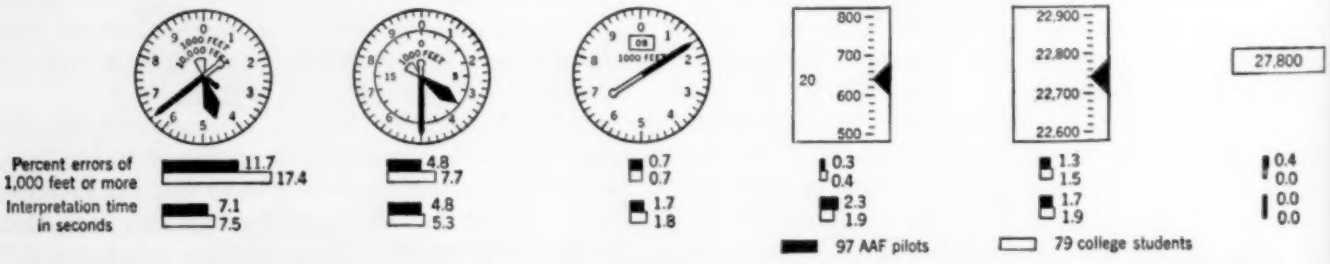
In general, a control setting requires three separate actions, each taking a time that is characteristic of the task. The "starting time", of the order of a second, is always required before the motion starts, and has a length independent of the other speeds of the control setting. The "travel time" varies with the mechanical advantages of the controls. It is greater as the pointer movement is less for a given motion of the control knob. Research showed that one control worked best when the pointer moved 1 to 2 inches per revolution of the control knob. Finally an "adjustment time" is required to set the pointer exactly on the target point. This time is generally longer when the travel time is shorter.

Studies of this type can be very useful for cases where the time available to make a control setting is short, or when a great deal depends on the speed of making the setting. As interesting as any other feature of the problem is the fact that a period of psychological preparation—the starting time—is always required, which is not reduced by changes in the control design.

The Structural Strength of the Human

One of the most rapidly advancing branches of modern technology is the design of high-speed vehicles. When the vehicle is an aircraft controlled by a pilot, his reaction time as a servo link in the control system becomes important. Furthermore, his efficiency in the environment of the cockpit becomes more and more a problem as the environment becomes more difficult. Such is the case with aircraft of higher and higher speeds and service ceilings.

As far as speeds themselves are concerned, the story is very clear. A human being can go as fast as the speed of sound, or twenty times as fast, without any perceptible effect on his health. Of course, if he goes at speeds of, say, 12,000 knots (or miles per hour) *in the atmosphere*, his vehicle will get hot, and at higher



Reproductions of a number of altimeters are shown here. The conventional three-pointer altimeter is at the left. The number of errors and average reading time for pilots and college students are shown beneath each dial. **(After Grether, 1949, used by permission of the *Journal of Applied Psychology*)**

speeds, it may even begin to melt. But the man inside will be safe as long as he can keep cool.

The story is different for accelerations. In such cases, everything depends on the man's position. As a pilot pulls up out of a dive, he will be pushed down in his seat with a force a number of times his weight (known as "g's"). He can withstand up to four or five "g's" of acceleration in the pull-up without much danger. If the pilot wears a special kind of corset—a "g-suit"—he can stand as much as 6 g's. But, the blood will tend to stay down in his body cavity and away from his brain, and he will "black out"—simply be momentarily unable to see—if the acceleration is too great.

If the pilot lies down while he is being accelerated, he can withstand much larger rates of acceleration. It is probable that the maximum acceleration that man can stand, under ideal circumstances, is not known. At any rate, in one set of experiments in a rocket sled, a man survived some 60 g's or more of acceleration for a very short period without damage, thanks to a properly designed seat.

In every case of relatively "low" acceleration, the human body filled with fluids as it is, acts a little like a wet sponge. That is, the blood, acted on by the acceleration forces, drains "down"—or in whatever directions the forces cause it to drain. The tissues that are starved for blood, or glutted, as the case may be, show the easily predicted symptoms of the abnormality.

In the matter of very short and high accelerations, such as might occur in accidents to high-speed aircraft, there is also a great deal of information. Some of this information, incidentally, is of direct interest in connection with automobile body design.

Sudden accelerations—jolts or shocks—cause highly variable injuries depending also on the position of the passenger. Possibly the commonest injuries in crashes, for example, are injuries of the head and neck. These occur because the head is heavy, compared to other parts of the body, and the neck is relatively weak. A sudden stop of the vehicle will cause the head to swing until it strikes an object strong enough to stop it. If the head is supported by strong but soft aircraft structure, or if it strikes a padded surface, injuries may be much less serious than in the absence of such support or padding.

Occasionally a man will fall to the ground from some height and suffer no serious injury. It has been concluded that such a fortunate circumstance is most likely to result if the victim lands flat on his back. During deceleration, in such an attitude, each organ of the body tends to be pressed against the back, where it is attached. Thus, no rupture of organs occurs. Of course, the hardness of the surface that breaks the fall in such an accident is of decisive importance. And, again, if the velocity at impact is too high, the attitude can hardly prevent serious injury or death.

Another problem of man as a mechanism concerns his inability to live in aircraft at high altitudes without breathing pure oxygen. Oxygen is required above about 15,000 feet in an open cockpit. Even if pure oxygen is supplied, humans cannot be very efficient if air pressures are less than about a sixth of sea-level pressure. Such pressures occur above 45,000 feet altitude. At pressures corresponding to 65,000 feet altitude, or above, the water of the lung surface boils, and it is impossible for a man to get any air into the body.

All high-altitude aircraft have pressurized cabins and thus maintain an artificial atmosphere in which humans can live. It is interesting to note that a man can be put suddenly and safely into a low-pressure region. If he jumped from an aircraft at 45,000 feet altitude, he could experience, without injury, the air-pressure rise accompanying the free fall toward the earth, until he could breathe again. This "explosive decompression" has been experienced in the laboratory. It may be that explosive decompression is not a hazard in flight at altitudes below, say, 65,000 feet, if, for example, the cabin of a high-flying aircraft should suddenly burst. Of course, the passenger would have to be equipped with a parachute equipped to open after a suitable delay, while he fell downward into the denser air near the earth; and his emergence from the burst cabin would have to be free of violent accidents.

It might seem that structural strength is not properly a quality of a servo link that is pertinent to the present discussion. Actually much time is spent nowadays in design of servo components, to "ruggedize" them, and test their performance in difficult environments. Humans, as servo links, are actually in competition with mechanisms. And the future development of devices such as space ships may well depend on the ability of humans to withstand the rigors of flight, evaluated against the superiority, if any, of the performance of the human as a control device.

The Unique Properties of the Human in a Servo System

The characteristic of humans to become fatigued has been mentioned only briefly. That shortcoming, along with the necessity to keep them happy—possibly

by providing incentives and keeping them from getting bored—constitutes an argument for replacing men with machines whenever possible.

There are control functions, of course, where the human is uniquely superior to the machine. These are, particularly, intricate control functions involving complex stimuli. Leaving aside the situations that require original thought or decisions based on reasoned reflection, there remain many tasks like driving a car, flying an aircraft, or operating a complex machine, in which the human may be considered an indispensable link in a servomechanism. In such a relation, the human has the unique capacity for varying his performance as a servomechanism link, with time. Generally his delay time decreases—he gains skill.

Whenever a skill needs to be developed, the normal procedure is to send a man to school. After the initial period of education, he works a longer or shorter time as an apprentice, performing the desired actions, in part, for practice. Only after his dexterity has reached a suitable level does he work as a full-fledged journeyman.

In cases where the apprenticeship is expensive and hazardous, devices have been used to accomplish the same training by simulating the servo system in a suitable "trainer". The Link type of aircraft trainer is the outstanding example of this type of device. The aim of such machines is to modify the human servo link so that he can perform adequately in a servo system having both mechanical and human links.

Conclusions

This short review has been written to discuss the relation between men and machines as partners in technology, and has attempted thereby to stimulate thought directed toward improving the man-machine partnership to human advantage.

There are places in modern technology where the man-machine partnership is far from satisfactory. The present situation with regard to automobiles is an apt illustration. An accident represents a malfunctioning of a complex servomechanism. Each year the mechanical links get more sensitive, and the stimuli to which the driver must respond become more complex. The human link can often adjust to keep the mechanism efficient. Sometimes he fails to adjust.

Modern technology faces in this and many similar situations a new kind of challenge. The solution, when the problem is analyzed, may lie in the field of mechanical design; again it may lie in the field of education. But more and more, problems will have to be solved by an approach that is not limited to either field alone. Instead, the limitations of men and machines will have to be clearly recognized, and a solution found that embraces them both.

"Today, man cultivates food plant species of great commercial importance on millions of acres. Often they are grown to the exclusion of other plants, in vast pure stands of genetic materials. This practice makes a crop particularly vulnerable to attacks by weeds, insects, and virulent plant diseases. The rise of a form to which a widely grown variety or related varieties are susceptible means that plantings over vast areas may be seriously injured or wiped out. Since new forms of crop pests are continually being developed in nature, plant scientists must make a continuing search for sources of resistance to be incorporated in new varieties."

Karl Quisenberry in *The Scientific Monthly*

Science and Farm Surpluses

Science and technology can aid agriculture by helping to solve the problem of surpluses. New industrial crops and new uses for surplus crops and farm wastes are profitable areas of research.

by K. Starr Chester

Science can aid in solving the farm surplus problem if opportunities are developed for greater industrial use of agricultural raw materials. Such opportunities take three principal forms: (1) developing new industrial crops for some of the lands now devoted to surplus crop production, (2) finding new industrial uses for surplus crops, and (3) broadening industrial markets for farm wastes so that the profits from these would enable the farmer to accept lower prices for surplus commodities.

Only study and experience can determine the relative extent to which each of these paths of development should be carried. But, as their relative importance is determined, the most productive use of our farm lands could be achieved, and, in turn, the price of agricultural commodities would tend to settle at their natural market levels.

Opportunities for New Crops

The opportunities for developing new industrial crops for surplus acres are staggering. There are, in the world, some 300,000 different species of plants. Yet man has found use for only two per cent of these. Among these many thousands of wild plants, there surely must be others, like the soybean, that could be usefully grown for industrial raw materials on the 30 million acres now devoted to surplus production.

Since joining Battelle in 1948, Dr. Chester has been associated with a wide variety of agricultural studies, including the fields of plant pathology, bacteriology, chemistry, and chemurgy. In broader fields, he is serving as chairman of the International Committee on Plant Disease Losses and of the National Farm Chemurgic Council's Research Committee. Earlier, he served as director of the Research Foundation at Oklahoma A & M College and was associated with the Rockefeller Institute for Medical Research.

Soybeans are a tremendously successful industrial crop which, in a generation, has risen to occupy 14 million acres of former wheat and corn land.

Surplus acres could be used to develop other valuable additions to our economy such as new and better pharmaceuticals, fibers, vegetable oils, and industrial proteins. Important progress is being made toward the development of industrial uses for sesame, bamboo, safflower, and ramie. The surface of opportunities, however, has only been scratched.

Enormous tonnages of crop residues such as stalks, cobs, hulls, straw, and pits remain on the farm as almost useless wastes. Science is showing us how many of these can be converted into useful industrial products. There is, for example, furfural, Cinderella of industrial chemistry, a basic industrial raw material that enters into the manufacture of hundreds of end products ranging from nylon stockings to rocket fuel. Furfural is commonly made from corncobs or oat hulls. If farmers could get more income from such by-products, it would be possible for them to accept less for their principal products and still maintain, or increase, their total income.

Use of Wastes and Surplus Crops

The bottleneck to greater industrial use of farm wastes or residues is the cost of transporting bulky, low-value raw materials. One interesting possibility for overcoming this bottleneck is to perform a first step in manufacture based on the farm residues near the farm. This might be accomplished using portable semiprocessing equipment such as could be mounted on railroad cars or truck trailers and moved from place to place wherever the farm residues accumulate. Such local semiprocessing could reduce the bulk and increase the value of the residues to the point where it would be economical to transport them to a central plant for completing the manufacturing process.

Science has already found many industrial uses for the farm commodities that are in surplus supply. Industrial chemicals can be made from starches and sugars, textiles from corn protein, antibiotics from corn steep liquor, paper coatings from milk protein, and numerous others. Many more industrial uses will be found. However, there are two bottlenecks, technological and economic. On the technical side, we need much more information on the chemical and physical properties of our farm products. Of all plants grown by man, only a few, such as wheat, corn, and soybeans, have been thoroughly characterized, chemically and physically.

Competition with Substitutes

The other bottleneck is economic. Many industrial processes that formerly were based on agricultural raw materials have now shifted to synthetic or substitute raw materials. The chief reason is that the substitute materials are cheaper. The agricultural raw materials have priced themselves out of the industrial market. For example, butanol and acetone, basic industrial chemicals, were formerly made from corn. Today the plants that made these chemicals from corn are idle, and the chemicals are being manufactured from petroleum or natural gas. Glycerol, another basic industrial chemical, was formerly made from tallow, and to some extent from cottonseed oil and soybean oil. Now synthetic glycerol is taking over the market.

This trend away from industrial use of agricultural raw materials might be reversed if it could be made more attractive for industry to use the surplus commodities. There is well-established precedent in the United States for offering industry incentives when the desired industrial operations are in the public interest, in the nature of an emergency, or represent economic risks. Industrial use of the surpluses fits all three of these situations.

Science could perform a most valuable service to our economy if a thorough analysis could be made of the possibilities and problems involved in greater industrial use of agricultural raw materials. Efforts are already under way to have this analysis made.

FIRST COIN MACHINE

"Automatic selling is actually far from new. The idea of selling through machines which would take the place of both the sales person and the cashier can be traced to antiquity. The first automatic selling machine was built in 219 B. C. by the Greek inventor, Hero Cstebus. Hero's device was built to sell holy water to the worshippers in Greek Temples. The principle it used in delivering the holy water is still the basic principle employed by the modern mechanical merchant.

"Hero's vending apparatus was a simple but ingenious mechanism consisting of a tube, a lever which opened a crude valve and a cap which closed the opening. A horizontal lever at the top of the tube controlled the dispensing action. A coin inserted in an opening at the top of the machine fell on the control lever. The weight of the coin pushed the lever down, opened the cap and released a quantity of water. Once the coin fell off the lever into a money box, the lever returned to its original position and the valve closed."

G. R. Schreiber in *Automatic Selling*

Notes From Battelle

MOLYBDENUM WIRE PUZZLE

RESEARCH TECHNOLOGISTS often run into puzzles, the answers of which are difficult to find. A metallurgical puzzle has recently been holding the attention of some members of Battelle's metallurgical engineering division. They have been trying to discover why 0.04-inch-diameter sintered and wrought molybdenum wires showed a wide range of ductility after vacuum heat treatment.

The investigation is in connection with a project sponsored by the Office of Naval Research.

W. E. Few and G. K. Manning report that specimens of wire, heated to 3800 F in about 15 minutes, showed erratic results—some were ductile, others fairly brittle. Later experiments showed that samples heated more rapidly than the 15-minute period were ductile unless they were slowly reheated. But samples that were heated less rapidly than 15 minutes, were less ductile. Thus, the 15-minute heating-period rate appeared to be critical.

However, if specimens of either type were held at 3800 F for six hours, they exhibited more than 25 per cent elongation in two inches and were made permanently and nonreversibly ductile. Apparently, solid-state purification had occurred.

All possible factors that might bring about such behavior have been investigated—chemical analysis of the molybdenum, grain size of the specimens, furnace operations, possible contamination, and cooling rates. The Battelle technologists are still seeking the solution for their puzzle.

FUTURE U. S. MINERAL NEEDS

SEVERAL ESTIMATES OF the future mineral requirements of the United States have been presented; the most recent was released in 1952 by the President's Materials Policy Commission. But with the passing years, estimates must be reviewed to bring the picture up to date. Such a review was recently presented before the Mineral Resources Conference at Dallas, Texas, in a paper by Clyde Williams and Richard J. Lund, both of Battelle.

As they see it, the important factors that will determine mineral needs in the next 20 years are population growth, progress in research and technology, and the increasing emphasis on free enterprise. The Battelle authors expect the gross national product to rise from a 1954 level of $356 billion to about $700 billion by 1975.

Williams and Lund analyzed the PMPC estimates in terms of per capita consumption. They pointed out that, in most cases, increases in mineral needs will result both from population growth and expanding per capita consumption. The authors suggest that the PMPC estimate of 1430 pounds per capita of steel in 1975 may be conservative in view of the 1953 figure of 1400 pounds per capita. Estimates for other minerals to 1975 appear to be realistic in terms of past growth and future anticipation.

The constantly rising demand for electricity will take an increasing amount of coal. But Williams and Lund suggest that coal's gain from electric power demands will be balanced by losses in other uses to petroleum and natural gas. Therefore, the demand for coal is likely to remain at approximately the current per capita rate, at least until atomic energy begins to contribute a net balance of energy to our economy.

CRYSTAL INDEXING CHARTS AVAILABLE

MANY OF THE X-ray and electron diffraction powder patterns of the crystalline structures of standard materials have been classified. The American Society for Testing Materials, for example, has established such a classification. Normally, crystalline phases of metals and alloys, chemicals, and other materials may be identified by comparison with standard patterns such as those available in the ASTM Index. Unfortunately, patterns of many compounds have not been recorded. Data on the crystal system and unit cell constants of many of the unrecorded compounds, however, are available.

Charts specifically designed for determining the interplanar spacings of tetragonal, hexagonal, and orthorhombic crystals from data on crystal systems and unit cell constants have been prepared by J. C.

Bell and A. E. Austin of Battelle. The "Battelle Indexing Charts for Diffraction Patterns of Tetragonal, Hexagonal, and Orthorhombic Crystals", which were originally conceived by R. A. Harrington, provide a simple and convenient nomographic method for making such determinations. Copies of these charts may be obtained by writing to the Battelle Publications Office, 505 King Avenue, Columbus 1, Ohio.

SCIENTIFIC RUSSIAN

THE SHORTAGE OF persons qualified to read technical Russian is a cause of concern for leaders in technology. A study of the problem by a committee of the American Association of Teachers of Slavic and Eastern European Languages of the United States (AATSEEL) has brought out the fact that enrollments for Scientific Russian appear to be decreasing. The Association suggests three causes for this decline:

1. The requirement of at least 15 hours of General Russian before a student can enroll in a course in Scientific Russian.
2. The scarcity of competent teachers of Scientific Russian.
3. The lack of comprehensive textbooks and teaching aids covering the general rather than the specific phases of Scientific Russian.

AATSEEL is attempting to alleviate the situation. Nicolas Baklanoff of Battelle, who is first vice president of AATSEEL and former chairman of the special committee, reports that the Association has been attempting to improve the situation by: (1) determining the possibility and advisability of teaching Scientific Russian without requiring prior courses in General Russian; and (2) determining the best methods of teaching Scientific Russian for the general field of science.

CYCLIC CHANGES IN METALS

IN MODERN USAGE of metals at elevated temperatures, periodic changes in temperature and stress are often involved. Unfortunately, design engineers have available only constant stress and temperature data for most metals. This places them at a disadvantage when they are designing for situations where temperature and stress changes must be expected.

A step has been taken to aid both the designer-engineer and the researcher in this area. The Gas Turbine and General Research Panels of the Joint ASTM-ASME Committee on the Effect of Temperature on the Properties of Metals held a symposium on "The Effect of Cyclic Heating and Stressing on Metals at Elevated Temperatures." The papers have been published by the American Society for Testing Materials, 1916 Race Street, Philadephia 3, Pennsylvania.

Among the papers presented was one by Battelle technologists Ward F. Simmons and Howard C. Cross on "Constant and Cyclic-Stress Creep Tests on Several Sheet Materials". Other subjects included were: "What We Need To Know About Creep"; "The Problem of Thermal Stress Fatigue in Austenitic Steels at Elevated Temperatures"; "The Effect of Temperature Cycling on the Rupture Strength of Some High-Temperature Alloys"; "Experiments on the Effects of Temperature and Load Changes on Creep-Rupture of Steels"; "Effects of Cyclic Overloads in the Creep Rates and Rupture Life of Inconel at 1700 and 1800 F"; and "The Effects of Composition on the Scaling of Fe-Cr-Ni Alloys Subjected to Cyclic Temperature Conditions".

AMONG ITS 6000 libraries, Switzerland possesses a number with excellent collections of scientific and technical literature, according to a report by J. J. Breitenbucher, librarian at Battelle's Geneva laboratory. The largest of these is in the Swiss Institute of Technology—the national library of Switzerland in the fields of science and technology. Fine collections are also to be found in the libraries of the universities of Basle, Berne, Fribourg, Geneva, Lausanne, Neuchâtel, and Zurich. Another institution, the Bibliographical Swiss Center, publishes bibliographies in the fields of general science and medicine.

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Dr. Ray E. Heiks has been selected to guide the sponsor relations of Battelle's department of chemistry. He will provide liaison between the Institute and the chemical and allied industries. Heiks, who joined Battelle in 1942, was formerly chief of the Institute's division of physical chemistry.

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A program to expand Battelle research facilities for the forest products and wood-using industries is being spearheaded by W. C. Finley. Formerly active in wood-industry trade associations, and consultant to various forest-product organizations, he will provide liaison between the Institute and the wood industries.

Writings by Staff Members*

Influence du Carbone et du Manganèse sur les Caractéristiques des Aciers Semi-Effervescents Apres Laminâge à Chaud. (The Influence of Carbon and Manganese on the Properties of Semikilled Hot Rolled Steel.) F. W. Boulger and R. H. Frazier. *Centre de Documentation Siderurgique, Circulaire d' Informations Techniques,* vol. II, No. 10, 1954, pp. 1781-1798.

Lowering the carbon and increasing the manganese content increases the toughness of semikilled hot-rolled steel, which is used principally in ship building.

Centennial of Engineering, 1852-1952. History and Proceedings of Symposia. Museum of Science and Industry. Chicago, 1953. Contains these papers by Battelle staff members:

Demands for Energy. Richard J. Lund. pp. 834-863.

Discusses the trends in over-all use and the use patterns of energy on the basis of fuel types. Includes consideration of losses and waste of energy, the geographical features of energy demands, and probable demands in the future.

Nonmetallic Minerals. John D. Sullivan. pp. 567-577.

Stresses the significance in our national economy of nonmetallic minerals (except fuels) in comparison to metals and other engineering materials and shows their growth. Considers nonmetallics from a functional viewpoint as those that are ultimately consumed primarily in the nonmetallic state.

Mechanical Properties of Alpha Titanium as Affected by Structure and Composition. R. I. Jaffee, F. C. Holden, and H. R. Ogden. *Journal of Metals,* November, 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* vol. 200, pp. 1282-1290.

Increasing alpha grain size decreases strength and hardness and increases impact resistance of titanium. Quenching from the beta field produces sub-grain markings delineating alpha plates in Ti-N alloys but not in Ti-Al alloys.

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**Members of the Battelle staff are authors of the recently published articles, and books listed on this page. In most cases, reprints are available from the Battelle Publications Office, 505 King Avenue, Columbus 1, Ohio.*

Properties of Ceramic-Coated Metals. Burnham W. King. *Materials and Methods,* October, 1954, pp. 104-106.

Presents a summary of the properties and possible applications of ceramic-coated metals.

Steel-Container Treatments, Part I. L. J. Nowacki, E. R. Mueller, and R. H. Dent. *Modern Packaging,* November, 1954, pp. 163-166.

Discusses how metal-surface conditions, such as scale, affect the performance of exterior enamels and organic linings in steel containers, and describes the effects of phosphate treatments of various types and weights as well as chromic acid rinse on the performance of organic coatings under various conditions.

Coated Containers—You Can Get More Into Them. L. J. Nowacki. *Steel,* November 8, 1954. pp. 92-93.

Steel containers may now be used for products which previously could not be packaged in steel because of their corrosive nature or because of danger of contamination by iron. The development of organic linings has made this possible. Related investigations led to improved cleaning and pretreatment of containers before painting.

Machine Literature Searching, Part VI. Class Definition and Code Construction. J. W. Perry, M. M. Berry, and Allen Kent. *American Documentation,* October, 1954, pp. 238-244.

The logical theory of class definition provides the basis for: (1) analyzing the subject content of scientific and technical papers, patents, reports, etc.; (2) identifying which documents are of pertinent interest to a given information requirement; and (3) designing automatic equipment to conduct such identification automatically and rapidly.

Iron, Mild Steels, and Low-Alloy Steels. Homer L. Shaw. *Industrial and Engineering Chemistry,* October 1954, pp. 2084-2087.

Reviews the properties and possible uses of iron, mild steels, and low-alloy steels as they relate to constructions in the chemical engineering field.

ABSTRACT INDEX

Aeronautical Engineering 1a
Agriculture 2a
Biochemical and Biophysical Research 4a
Ceramics and Concrete 6a
Chemical Engineering 8a
Chemistry—Analytical and Inorganic 10a
Chemistry—Organic 13a
Chemistry—Physical 15a
Coatings 18a
Corrosion 20a
Electrical Engineering 22a
Electrochemistry and Electroprocesses 23a
Electronics 25a
Engineering Economics 30a
Fluid Mechanics 31a
Food Technology 31a
Fuels and Combustion 32a
Geology and Mineralogy 33a
Geophysics 34a
Graphic Arts 34a
Heat Power 34a
Information—Preparation and Dissemination 35a
Instrumentation and Laboratory Apparatus 36a
Lubrication and Friction 38a
Mechanical Engineering 39a
Metallurgy 40a
Metals—Extraction and Refining 42a
Metals—Finishing, Polishing, and Cleaning 44a
Metals—Foundry Practice 44a
Metals—Heat Treatment 45a
Metals—Mechanical and Physical Properties 46a
Metals—Mechanical Working 50a
Metals—Metallography, Transformations, and Structures 52a
Metals—Powder 55a
Mining Engineering 56a
Nondestructive Testing 56a
Nuclear Physics, Nucleonics, and Radiation 57a
Operations Research and Management Engineering 59a
Ore and Materials Beneficiation 59a
Physics 60a
Plastics 63a
Pollution and Wastes 65a
Rubber and Elastomers 67a
Space Heating and Conditioning 68a
Textiles and Fibers 68a
Welding and Joining 69a
Wood and Forest Products 71a

BATTELLE TECHNICAL REVIEW ABSTRACTS

Volume 4, Number 1 January 1955

***Asterisks mark items that may be used in the Battelle Library only. None of the unbound materials listed below are available for interlibrary loan.**

AERONAUTICAL ENGINEERING

1 Cooling Techniques for Airborne Equipment. Cecil Martin. *Aero Digest*, v. 69, Oct. 1954, p. 33-37.

Analysis of available cooling methods for aircraft electrical equipment indicates steam system is superior. Graphs, diagrams, photograph.

2 Test Development of Structures Designed Understrength. John H. Meyer. *Aeronautical Engineering Review*, v. 13, Oct. 1954, p. 54-64.

Design procedure for stretch testing and its significance. Tables, graphs, photographs. 9 ref.

3* Performance of a Constant-Speed Drive. E. W. Giloy. *Applications and Industry*, 1954, no. 14, p. 179-184.

Performance of a variable ratio hydraulic-mechanical drive utilizing aircraft engine shaft power for a regulated frequency a.c. generator. Photographs, graphs, table. 2 ref.

4* Evaluation of Designs for Intermittently Heated Surfaces. Thomas M. Dahm and Raymond A. Holloway. *Applications and Industry*, 1954, no. 14, p. 198-205.

Thermal transmission line analysis of theoretical or analogue computer type for evaluation of proposed configurations of such an item as an electrically heated deicer boot. Graphs, table. 5 ref.

5 Human-Engineered Electromechanical Tactual Sensory Control System. James W. Ballard and Richard W. Hessinger. *Electrical Manufacturing*, v. 54, Oct. 1954, p. 118-121.

Aircraft guidance device is designed around a "thumb actuator". Photographs, diagram. 9 ref.

6* How a Comparative Weight Analysis of Aircraft Actuators Aids Designers in Choosing the Most Efficient Type. Robert C. Treseder and Howard M. Geyer. *General Motors Engineering Journal*, v. 1, Sept.-Oct. 1954, p. 7-11.

Comparison of power-transmission systems is made on basis of wt, size, and overall efficiency, and an examination of generator, storage, transmission, and utilization of power by actuator. Graphs.

7* Life Expectancy of Aircraft Under Thermal Flight Conditions. George Gerard. *Journal of the Aeronautical Sciences*, v. 21, Oct. 1954, p. 675-680.

New structural problems resulting from flight of aircraft under variable stress and elevated temperature conditions arising from aerodynamic heating; a cumulative creep hypothesis for use in analysis of life expectancy. Diagrams, graphs. 7 ref.

8* Simplified Analysis of Turbulent Boundary-Layer Development Along Cylindrical Surfaces With Variable Free-Stream Mach Number. Hans U. Eckert. *Journal of the Aeronautical Sciences*, v. 21, Oct. 1954, p. 695-706.

Includes graphs. 35 ref.

9* The Two New Terrestrial Moons and American Astronautical Policy. Wayne Proell. *Journal of Space Flight*, v. 6, Oct. 1954, p. 1-5.

Possibilities for practical use of new satellites. Recommendations for government action on space flight. 9 ref.

10 On Calculating Incompressible Turbulent Boundary Layers With Arbitrary Pressure Distribution. (English.) H. Schuh. *Kungl. Tekniska Högskolan. Institutionen för Flygteknik (Royal Institute of Technology, Stockholm, Sweden, Division of Aeronautics, Technical Notes)*, 1954, no. 41, 23 p. (TL526.S8 K96.4t)

Method of calculating momentum thickness and profile parameters. Tables, graphs. 17 ref.

11 The Field of Flow Through a Helicopter Rotor Obtained From Wind Tunnel Smoke Tests. J. Meijer Drees and W. P. Hendal. *Netherlands Nationaal Luchtvaartlaboratorium Report* A. 1205, Feb. 1950, p. A17-A19 + 5 plates.

Results of tests on a simplified helicopter rotor in an open-jet wind tunnel. Diagrams, graph, photographs. 3 ref.

12* (Observations on a Criterion of Laminar Separation in the Tridimensional Boundary Layer.) **Observations sur un critère de décollement laminaire dans la couche-limite tridimensionnelle.** E. A. Eichelbrenner and A. Oudart. *Recherche Aéronautique*, 1954, no. 40, July-Aug., p. 3-5.

Case for an elliptical cylinder in oblique attack. Diagrams. 3 ref.

13* (Semitheoretical Calculation of a Position Servo Mechanism.) **Calcul semi-théorique d'un servo-mécanisme de position.** R. Moreau. *Recherche Aéronautique*, 1954, no. 40, July-Aug., p. 27-31.

Method of calculating performance of servo mechanisms in aeronautical technology. Tables, graphs.

14 Summary of Stalling Characteristics and Maximum Life of Wings at Low Speeds. Hans Olof Palme. *SAAB Aircraft Company, Technical Notes, SAAB TN* 15, 1953, 21 p. (TL504 Sv23t)

Investigation of stall patterns and the maximum lift coefficient of clean wings. Diagrams, graphs. 35 ref.

15 Summary of Wing Tunnel Data for High-Lift Devices on Swept Wings. Hans Olof Palme. *SAAB Aircraft Company, Technical Notes, SAAB TN* 16, 1953, 18 p. (TL504 Sv23t)

High-lift devices on profiles and swept wings; method for calculating lift at a given angle of attack for wings with flaps. Diagrams, graphs. 36 ref.

16 Mechanism of Start and Development of Aircraft Crash Fires. I. Irving Pinkel, G. Merritt Preston, and Gerard J. Pesman. *U. S. National Advisory Committee for Aeronautics, Report* 1133, 1953, 52 p. (TL521 Un3r)

Results of full-scale aircraft crashes, devised to give large fuel spillage and a high incidence of fire. Photographs, diagrams, graphs.

17 The Zero-Lift Drag of a Slender Body of Revolution (NACA RM-10 Research Model) as Determined From Tests in Several Wind Tunnels and in Flight at Supersonic Speeds. Albert J. Evans. *U. S. National Advisory Committee for Aeronautics, Report* 1160, 1954, 13 p. (TL521 Un3r)

Includes diagrams, graphs, table. 3 ref.

18 Experiments on Tail-Wheel Shimmy. O. Dietz and R. Harling. *U. S. National Advisory Committee for Aeronautics,*

Aeronautical Engineering

Technical Memorandum 1376, Oct. 1954, 81 p. (TL570 Un3tm) (Translated from "Experimentelle Untersuchungen über das Spornradflattern." Zentrale für wissenschaftliches Berichtswesen über Luftfahrtforschung des Generalluftzeugmeisters (ZWB), Forschungsbericht Nr. 1320, Berlin-Adlershof, Nov. 25, 1940, p. 1-101.)

Investigation of the causes of the undesirable shimmy phenomena frequently occurring on airplane tail wheels, and the means of avoiding them. Diagrams, graphs, photographs. 9 ref.

19 Calculated Subsonic Span Loads and Resulting Stability Derivatives of Unswept and 45° Sweptback Tail Surfaces in Sideslip and in Steady Roll. M. J. Queijo and Donald R. Riley. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3245, Oct. 1954, 110 p. (TL570 Un3t)

Includes graphs, diagrams, tables. 8 ref.

20 Lift and Moment Equations for Oscillating Airfoils in an Infinite Unstaggered Cascade. Alexander Mendelson and Robert W. Carroll. *U. S. National Advisory Committee for Aeronautics, Technical Note,* 3263, Oct. 1954, 46 p. (TL570 Un3t)

Exact equations are derived for the oscillatory aerodynamic forces acting in an unstaggered cascade of airfoils fluttering in potential flow. Diagrams, graphs, tables. 18 ref.

See also:
461 (electrical power for aircraft)
754 (aircraft test equipment)
771 (aircraft powerplant)
849 (hydraulics in aircraft)
1218 (aeronautical uses of powdered metals)
1289 (operations research for air-borne weapons)
1429 (fatigue of aircraft materials)

AGRICULTURE

21* Maleic Hydrazide. A Plant Growth Inhibitor. John W. Zukel. *Agricultural Chemicals,* v. 9, Oct. 1954, p. 46-47, 113, 115.

Summary of major work done with the chemical and a report on its status in the agricultural chemical field. Photographs. 35 ref.

22* Spectroscopy of Plant Pigments. I. Ethyl Chlorophyllides *A* and *B* and Their Pheophorbides. II. Methyl Bacteriochlorophyllide and Bacteriochlorophyll. A. S. Holt and E. E. Jacobs. *American Journal of Botany,* v. 41, Nov. 1954, p. 710-722.

Includes micrographs, graphs, tables. 30 ref.

23* Relation of Plant Nutrition to Disease Development. VIII. Verticillium Wilt of Tomato. J. C. Walker, M. E. Gallegly, Jr., J. R. Bloom, and R. P. Scheffer. *American Journal of Botany,* v. 41, Nov. 1954, p. 760-762.

Drip-sand culture studies indicated that rate of disease development increased with increase in nutrient concentration. Tables. 5 ref.

24* (The Photosynthesis Ferments.) **Über Photosynthese-Fermente.** Otto Warburg and Günter Krippahl. *Angewandte Chemie,* v. 66, nos. 17-18, Sept. 7, 1954, p. 493-496.

Quantum photo-energy required for CO_2 reduction is supplemented by the cell; ferment chain is delineated. Graph. 15 ref.

25* (The Mechanism of Action of Modern Synthetic Insecticides.) **Zum Wirkungsmechanismus moderner synthetischer Insektizide.** F. Duspiva. *Angewandte Chemie,* v. 66, nos. 17-18, Sept. 7, 1954, p. 541-551.

Shows sites of insecticidal action. Chlorohydrocarbon and P compounds are explored. 136 ref.

26* (Manner of Action of Growth Substances and Growth Inhibitors.) **Zur Wirkungsweise von Wuchs- und Hemmstoffen. IV.** (The Concentration-Action Curves of Several Synthetic Cell-Enlarging Substances in the Presence of Different Quantities of Synthetic Inhibitors.) **Die Konzentrations-Wirkungskurven einiger synthetischer Zellstreckungswuchsstoffe in Gegenwart verschiedener Mengen von synthetischen Hemmstoffen.** Hans Linser. *Biochimica et Biophysica Acta,* v. 15, no. 1, Sept. 1954, p. 25-30.

Tests of indole-3-acetic acid; *a*-naphthaleneacetic acid; 2,4,5-trichlorophenoxyacetic acid; 2,3,5-triiodobenzoic acid; 2,4,6-trichlorophenoxyacetic acid; 2,4,5-trichlorothiophenoxyacetic acid. Tables. 7 ref.

27* (Circulation of Salts in Plants.) **O podvizhnosti solei v rasteniiakh.** B. M. Golush. *Botanicheskii Zhurnal,* v. 39, no. 4, July-Aug. 1954, p. 560-566.

Determination of percentages of elements present in a series of plants. Tables. 10 ref.

28 Organo-Phosphorus Insecticides. K. A. Lord and C. Potter. *Chemistry & Industry,* 1954, no. 40, Oct. 2, p. 1214-1217.

Insecticidal and anti-esterase activity of organo-phosphorus compounds. Tables, graphs. 18 ref.

29* (Several New Insecticides.) **Über einige neue Insektizide.** H. Gysin. *Chimia (Switzerland),* v. 8, no. 9, Sept. 1954, p. 205-210.

Composition, including structural formulas; properties; and effectiveness of hydroaromatic urethanes as insect repellants and insecticides. Tables. (To be continued.)

30* (Several New Insecticides.) **Über einige neue Insektizide.** H. Gysin. *Chimia (Switzerland),* v. 8, no. 10, Oct. 15, 1954, p. 221-228.

Review of chemical compositions and effects of new agents. Tables. 15 ref.

31* (Above-Ground Nourishment of the Sugar Beet.) **Vnekornevaia podkormka sakharnoi svekly.** I .V. Iakushkin and T. R. Borodina. *Dostizheniia Nauki i Peredovogo Opyta v Sel'skom Khoziaistve,* 1954, no. 8, Aug., p. 32-37.

Airplane spraying with KCl neutralized double superphosphate and potassium-ammonium-phosphate. Tables, photographs.

32* (Electrode Method of Disinfecting the Soil in the "Il'ich Memorial" Kolkoz in the Mytishchinskii Region of the Moscow Province.) **Elektrodnyi sposob obezzarazhivaniia pochvy v kolkhoze "Pamiat' Il'icha" Mytishchinskogo Raiona Moskovskoi Oblasti.** A. I. Pozhidaev and E. A. Platonova. *Dostizheniia Nauki i Peredovogo Opyta v Sel'skom Khoziaistve,* 1954, no. 8, Aug., p. 49-50.

Use of electricity to kill weeds and organisms.

33 Nitrogen and Phosphorus Fertilisers in North-Western Europe. G. W. Cooke. *Fertiliser Society, Proceedings no.* 27, 1954, 40 p; disc., p. 41-46. (S631 F41p)

Reports a tour into France, the Netherlands, and Belgium to study production and use of dicalcium phosphate and nitrophosphate fertilizers. Photographs, graphs, tables. 36 ref.

34* Antibiotics in Plant Disease Control. John C. Dunegan. *Journal of Agricultural and Food Chemistry,* v. 2, Sept. 29, 1954, p. 1020-1022.

Results comparable to organic insecticides but economics is an important factor in agricultural applications. Structural formulas, photograph.

35* Disease-Resistance Factors in Wheat, Electrophoretic and Chromatographic Analysis of Protein Extracts of Wheat Seedlings. Robert E. Barrett and J. Harvey McLaughlin. *Journal of Agricultural and Food Chemistry,* v. 2, Sept. 29, 1954, p. 1026-1029.

Investigations to determine the protein constituents of rust-susceptible and rust-resistant wheat plants by electrophoresis of protein complexes in extracts and chromotography of amino acids remaining in the extracts after acid hydrolysis. Graphs, tables, electrophoretic patterns. 4 ref.

36 Recent Advances in Fertilizer Placement. I. Fertilizer Placement for Swedes and Turnips in Scotland. J. W. S. Reith. **II. Fertilizer Placement in England.** G. W. Cooke. *Journal of the Science of Food and Agriculture,* v. 5, Sept. 1954, p. 421-440.

Deposition below seed is most effective, band distribution is next. Tables, diagrams, photographs. 19 ref.

37 The Seasonal Variation in the Combined λ-Fucose Content of the Common British Laminariaceae and Fucaceae. W. A. P. Black. *Journal of the Science of Food and Agriculture*, v. 5, Sept. 1954, p. 445-448.

One of a series of reports on seaweed constituents. Graphs. 15 ref.

38 An Investigation Into the Caking of Granular Fertilizers. W. A. Mitchell. *Journal of the Science of Food and Agriculture*, v. 5, Sept. 1954, p. 455-456.

Claims cause is formation of NH_4Cl, and its migration to points of contact.

39* (The Role of Sulfate Reduction, and Its Demonstration in the Soil.) **A szulfátredukció szerepe és kimutatása talajokban** János Balogh, József Horváth, Mihály Solti, and Rezső Vámos. *Magyar Kémiai Folyóirat*, v. 60, no. 3, Mar. 1954, p. 94-95.

Studies and sulfate-reducing bacteria in soils. 6 ref.

40* (Influence of Mineral Fertilizers on Microbiological Processes of the Soil.) **O vliianii mineral'nykh udobrenii na mikrobiologicheskie protsessy pochvy.** I. A. Geller and F. B. Iuspe. *Mikrobiologiia*, v. 23, no. 4, July-Aug. 1954, p. 451-454.

Use of N and P fertilizers in culture of barley, grasses, clover, and sugar beets. Tables. 7 ref.

41* (25 Years' Research on Growth-Regulating Substance. A Critical Consideration of the Present Status of Research on Growth Substances.) **25 Jahre Wuchsstofforschung. Eine kritische Betrachtung des augenblicklichen Standes der Wuchsstofforschung.** R. Pohl. *Naturwissenschaften*, v. 41, no. 17, Sept. 1954, p. 392-400.

Theories and experimental results on the function of growth substance in the growth and cell division of plants. Photographs, diagrams.

42* (25 Years Research on Growth Substances.) **25 Jahre Wuchsstofforschung.** R. Pohl. *Naturwissenschaften*, v. 41, no. 18, Sept. 1954, p. 414-420.

Review of literature. Effects on sensitivity to light, geotropic factors, germination, and development of organs and blossoms of plants. 85 ref.

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Ten separately-paged papers on forest culture and management.

71* (The TMTD Preparation for Treating the Seed Roots of the Carrot.) **Preparat TMTD dlia protravlivaniia semennykh korneplodov morkovi.** A. A. Rusakova and S. E. Raskin. *Zemledelie*, v. 2, no. 8, Aug. 1954, p. 39-43.

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Collection, correlation, and evaluation of pertinent information covered by 35 papers from the fields of antimicrobic research.

74 Plant Regulators in Agriculture. H. B. Tukey, editor. 269 p. 1954. John Wiley & Sons, Inc., New York. (QK746 T81p)

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75* Bibliography of the Literature on The Minor Elements and Their Relation to Plant and Animal Nutrition. v. III, 4th Ed. 117 p. 1953. Chilean Nitrate Educational Bureau, New York. (ZQH521 C43b4)

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776 (information sources)
1462 (processing wastes as soil improvers)
1489 (biosynthesis of rubber)

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Aureomycin, terramycin, penicillin, and streptomycin labelled with Co^{60} were used. Tables. 8 ref.

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Biochemical and Biophysical Research

to some representative biological processes. A new understanding of the mechanisms governing rate processes in general.

See also:
42 (growth regulators)
73 (antiseptics and disinfectants)
265 (synthesis of steroids)
266 (synthesis of steroids)
692 (culture of unicellular algae)
739 (oceanic microbiology)
1263 (dextran as a plasma extender)
1267 (tritium in biological reactions)
1281 (post-irradiation infection)
1444 (streptococci as indices of pollution)

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107 An Experimental Study of Polarization Effects in Barium Titanate Ceramic. T. F. Hueter, D. P. Neuhaus, and J. Kolb. *Acoustical Society of America, Journal*, v. 26, Sept. 1954, p. 696-703.

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125 Variations in $BaTiO_3$ Single Crystals With Temperature. I. N. Belyaev, N. S. Novosil'tsev, E. G. Fesenko, and A. L. Khodakov. *Henry Brutcher, Altadena, Calif., Translation no* 2979, 4 p. (From *Doklady Akademii Nauk SSSR*, v. 83, no. 5, 1952, p. 675-676.)

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Preparation; properties. Tables. 3 ref.

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129* (Remarks on the Analysis of Commercial Silicon Carbide.) **Bemerkungen zur Analyse des technischen Siliziumkarbids.** H. Funk and H. Schauer. *Chemische Technik*, v. 6, no. 8, Aug. 1954, p. 432-433.

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Properties and applications of plasticized S, mortars, and resins as jointing materials in ceramic structures. Photographs. 13 ref.

132* (Ultimate Shear Stress and Internal Friction of Evacuated Clay.) **O predel'nom napriazhenii sdviga i vnutrennem trenii vakuumirovannoi gliny.** P. P. Budnikov and I. A. Al'perovich. *Doklady Akademii Nauk SSSR*, v. 98, no. 1, Sept. 1, 1954, p. 115-118.

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Strength under repeated and static loading. Photographs, tables, diagram, graphs. 8 ref.

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Summary of the developments over the past 3 yr. in methods and techniques of forming products at high temperatures, new products, and applications. Photographs, graph, diagram. 217 ref.

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World list of books and periodicals concerning glass. Papers on melting in glass tanks. Fractures; stress-strain properties; effects of Fe in glass.

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New technique makes possible parts with intricate design and high properties. Applications primarily in electronic and chemical industries. Photographs, tables.

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Research with radioactive isotopes shows that glass absorbs Pb and Bi. Measuring the adsorption and desorption of Pb is useful in the study of characteristic differences in the surfaces of different glasses. Tables, graphs. 17 ref.

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Study of the reaction of "tagged" BaO_2 + Fe_2O_3 to form Ba ferrites from 0 to 1100 C. Graphs. 10 ref.

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Identification. Mechanism. Evaluation of preventive methods. Tables, photographs, graphs. 11 ref.

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Method based on the determination of the increase in wt. of powder concentrates of Fe compounds extracted from bricks in the atmosphere of CO. Tables, graphs.

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New transducer materials for reversible conversion of mechanical to electrical energy have higher conversion ratios, are sturdier, and more uniform. Photographs, graphs, table. 14 ref.

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Chemical resistance and other properties of glass. Advantages of use in electroplating industry. Photographs.

147 Special Ceramics for Engineering Uses. T. G. Carruthers and A. L. Roberts. *Research*, v. 7, Oct. 1954, p. 379-383.

The possible use of sintered oxides—particularly alumina—as cutting tool materials. Table, photograph. 7 ref.

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Electrical conductivity, transport no., and viscosity of various silicates up to 1800 C. Probable mechanism of effects of metallic oxides on silica lattice. Diagrams, graphs. 13 ref.

149 Make Lightweight Aggregate From Shale. Tip Brown. *Rock Products*, v. 57, Oct. 1954, p. 78-79.

Description of plant equipment and operating procedures. Photographs, flowsheet.

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Includes graphs, diagrams, tables.

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New glass, called "silibor-quartz glass" is described as having excellent physical, optical, and thermal properties. Tables, photograph.

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Method of production and properties of paper, cardboard, and roofing paper. Photographs, table, micrographs, samples.

153* (Foam Glass.) **Schaumglas. II.** (Process Technique in the Production of Foam Glass.) **Zu Verfahrenstechnik bei der Herstellung on Schaumglas.** Ernst O. Schulz. *Silikattechnik*, v. 5, no. 8, Aug. 1954, p. 343-346.

High quality foam glass with uniform texture produced by pressure sintering a mixture of finely ground glass and a gas-evolving substance, followed by heat treating at elevated temperature to effect the evolution of gases. Graphs, photographs. 2 ref.

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Behavior of boron-containing and boron-free ground-coat enamels on sheet steel. Correlation of enamel composition to its properties. Graphs. 13 ref.

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Blisters in pottery bodies were caused by too fast drying of fine grained body. Photographs.

156* (Producing a New Line of Whiteware.) **Eine neue Fabrikationsline in der weissen Keramik.** Carl Gustaf Herlitz. *Sprechsaal*, v. 87, no. 17, Sept. 5, 1954, p. 423-425.

Development and manufacture of dinnerware with a porosity of 0.3 to 1.0%.

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158* (Frost Damage in Freshly-Poured Concrete.) **Skader ved frost på nystøpt betong.** C. J. Bernhardt. *Teknisk Ukeblad*, v. 101, no. 31, Sept. 2, 1954, p. 681-687.

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160* (Highly Efficient Automatic Shaft Kiln.) **Vysokoproizvoditel'naia avtomaticheskaia shakhtnaia pech'.** E. I. Khodorov. *Tsement*, v. 20, no. 5, Sept.-Oct. 1954, p. 5-9.

Design and operating characteristics of vertical shaft cement kiln. Diagram, graphs.

161* (Obtaining Alumina Cement Clinker on Sintering Grate.) **Poluchenie glinozemisto-tsementnogo klinkera na spekatel'noi reshetke.** G. S. Val'berg and F. I. Pirogova. *Tsement*, v. 20, no. 5, Sept.-Oct. 1954, p. 10-15.

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201 (rubber bonded abrasives)
465 (electrical properties of $CaO \cdot ZrO_2$ and $MgO \cdot ZrO_2$)
734 (minerals as ceramic raw materials)
950 (refractories for blast furnaces)
990 (refractories for cupola furnaces)
1077 (frictional adhesion of metal to glass)
1331 (metastable states of $BaO \cdot TiO_2$)

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166 Active Carbon: Preparation and Application. John W. Hassler. *Anthracite Conference, Transactions, Lehigh University, Eleventh*, 1953, p. 117-126. (TN820 An86t)

Uses and sources of raw material for the manufacture of activated C.

167* (Methods of Testing Bitumen Emulsions According to German and Foreign Specifications.) **Prüfverfahren für Bitumenemulsionen nach deutschen und ausländischen Vorschriften.** H. Raudenbusch. *Bitumen, Teere, Asphalte, Peche*, v. 5, no. 8, Aug. 1954, p. 235-238.

Comparison standards on testing for composition and water content, homogeneity, storage stability, low-temperature coagulation, and viscosity. Tables. 3 ref.

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Short review; description of process. Photographs, diagrams, graphs.

176* (Kinetics of Carbon Oxidation at Moderate Temperatures.) **Die Kinetik der Kohlenoxydation bei mässigen Temperaturen.** Hans Sommers and Werner Peters. *Chemie-Ingenieur-Technik*, v. 26, nos. 8-9, Aug.-Sept. 1954, p. 441-453.

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Viscosity recorders and automatic regulators. Photographs, diagrams.

179* (Production of Sulfur From Gases With Thioarsenate Solution.) **Die Gewinnung von Schwefel aus Gasen mittels Thioarsenatlösung.** J. Helm and M. Brychta. *Energietechnik*, v. 4, no. 8, Aug. 1954, p. 357-360.

Method of extracting S from coking gas with ammonium thioarsenate. Diagram, tables. 2 ref.

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Characterization of closed-circuit process. Flowsheet, diagrams, photographs, table.

181* (The Influence of Temperature on the Danger of Explosions and Its Significance for Explosion Safety Measures for Storage Tanks of Combustible Liquids.) **Der Temperatureinfluss auf die Explosionsgefahr und seine Bedeutung für Explosionsschutzmassnahmen bei Lagertanks brennbarer Flüssigkeiten.** Rudolf Radusch. *Erdöl und Kohle*, v. 7, no. 8, Aug. 1954, p. 511-513.

Relations between vapor pressure, temperature, flashpoint, and explosion limit. Tank design. Economic considerations. Photograph, graphs.

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Description of instruments employed in catalytic cracking unit. Diagrams.

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Status report on the technology and economics of ethylene production. Tables, graph. 21 ref.

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199 New Catalyst Recovery Device. W. E. Askey, S. W. Dedman, and J. W. Smalling. *Petroleum Refiner,* v. 33, Oct. 1954, p. 137-140.

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202* (Recent Results on the Kinetics of Grinding Processes.) **Neuere Ergebnisse über die Kinetik von Zerkleinerungsvorgängen.** H. Sales and G. F. Hüttig. *Staub,* 1954, no. 37, p. 363-371.

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Tabulation of capacities and products. Tables.

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205 Successful Commercial Chemical Development. H. M. Corley, editor. 374 p. 1954. John Wiley & Sons, New York. (TP155 Su18)

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206 Chemical Business Handbook. John H. Perry, editor. Chemical Engineering Series. Sections individually paged. 1954. McGraw-Hill Book Company, Inc., New York. (HD9650 P42c)

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43 (manufacture of pesticides)
342 (thermodynamics of alcohol-hydrocarbon systems)
509 (effects of pH on chlorine-caustic electrolysis)
654 (production of phenol)
671 (statistical analysis in the chemical industry)
689 (chemical engineering in food industry)
713 (coal hydrogenation)
724 (gas producers)
873 (theory of grinding processes)
1451 (industrial fermentation)
1456 (waste disposal in oil refineries)
1573 (cation exchange reactions)

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Results were independent of paper or solvent; pH had greatest effect. Photographs, tables, diagram.

218 Determination of 2,4-Dichlorophenoxyacetic Acid, 2,4,5-Trichlorophenoxyacetic Acid, 2-Methyl-4-Chlorophenoxyacetic Acid, and 4-Chlorophenoxyacetic Acid. Poul Sorensen. *Analytical Chemistry*, v. 26, Oct. 1954, p. 1581-1585.

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Technique permits determination of Na and K in ceramics without separation of Al, Fe, Ca, or Mg. Diagrams, tables, graphs. 3 ref.

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118 (analysis of glass)
129 (analysis of commercial SiC)
310 (micro and semimicro analysis)
312 (analysis of acrylic esters)
516 (analysis of Fe)
711 (analysis of coal extracts)
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299* Synthetic Experiments in the Benzopyrone Series. XLIX. A Convenient Synthesis of Flavones of the Primetin Series. P. S. Kohli, S. K. Mukerjee, and T. R. Seshadri. **L. Nuclear Methylation of Quercetin.** A. C. Jain and T. R. Seshadri. *Journal of Scientific & Industrial Research,* v. 13, sec. B, Aug. 1954, p. 535-544.

Includes structural formulas. 15 ref.

300* Hydroxy Ketones. I. Fries Rearrangement of the Phenyl & Isomeric Cresyl Esters of 1-Naphthoic Acid. G. S. Saharia. *Journal of Scientific & Industrial Research,* v. 13, sec. B, Aug. 1954, p. 544-546.

Includes table. 8 ref.

301* **Dimethyl-Glyoxime.** *Laboratory Practice*, v. 3, Oct. 1954, p. 419-424.

Reviews chemistry and applications. 130 ref.

302* (Improving Quality of Wax Emulsions.) **Uluchshenie kachestva voskovykh emul'sii.** R. A. Metlitskaia and A. L. Zaides. *Legkaia Promyshlennost'*, v. 14, no. 8, Aug. 1954, p. 21-25.

Waxes and techniques for manufacture of polishes for leather. Tables, micrographs, photograph.

303 The Structure of Oils and Resins: Spectroscopy. N. H. E. Ahlers and L. A. O'Neill. *Oil & Colour Chemists' Association, Journal*, v. 37, Oct. 1954, p. 533-559; disc., p. 559-561.

Reviews present position; problems are cited, especially those amenable to spectroscopy. Infra-red and ultra-violet spectrograms, tables. 57 ref.

304 From Natural Gas to Acrylonitrile. D. P. Thornton, Jr. *Petroleum Processing*, v. 9, Oct. 1954, p. 1589-1591.

Four principal reactions in the process via C_2H_2, NH_3, and HCN. Future production includes H_2SO_4, $(NH_4)_2SO_4$ and anhydrous NH_3. Diagrams.

305 Understanding the Chemistry of Petrochemical Reactions. XVII. Preparation and Properties of Acetylenes. Lewis F. Hatch. *Petroleum Refiner*, v. 33, Oct. 1954, p. 131-135.

Production by the CaC_2 process and by three processes utilizing natural gas. Tables, diagrams.

306* (Kinetics and Decomposition Mechanism of Gaseous Acetic and Propionic Aldehydes.) **Cinétique et mécanisme de décomposition des aldéhydes acétique et propionique gazeux. III.** (Decomposition Reactions of Gaseous Propionaldehyde.) **Réactions de décomposition du propionaldéhyde gazeux. IV.** (Mechanism and Rate of Chain Decomposition at Any Given Moment.) **Mécanisme et vitesse d'une décomposition en chaines à un instant quelconque.** Michel Niclause. *Revue de l'institut français du pétrole et Annales des combustibles liquides*, v. 9, no. 8, Aug. 1954, p. 419-448.

Reactions. Interpretation of the mass action of CO reaction product on the normal pyrolysis of acetaldehyde. Tables, graphs. 25 ref.

307* (Ebullioscopic Determination of Molecular Weights on Hemicolloidal Polystyrolene and Polymethacrylates by a New Process and the Relation Between Viscosity and Molecular Weight.) **Ebullioskopische Molekulargewichtsbestimmungen an hemikolloiden Polystyrolen und Polymethaerylaten nach einem neuen Verfahren und die Beziehung zwischen Viskositätszahl und Molekulargewicht.** K. G. Schön and G. V. Schulz. *Zeitschrift für physikalische Chemie (Frankfurt)*, v. 2, nos. 3-4, Oct. 1954, p. 197-214.

Precise apparatus and procedure; correlates viscosity and mol. wt. as determined by different methods and authors. Tables, diagrams, graphs. 10 ref.

308* (Exchange of Radicals Between Organic Compounds in Solution.) **Obmen radikalov mezhdu organicheskimi soedineniiami v rastvore.** I. P. Gragerov. *Zhurnal Obshchei Khimii*, v. 24, no. 8, Aug. 1954, p. 1321-1326.

Exchange of methyl, ethyl, and phenyl radicals. Temperature and time of the reactions. Table. 11 ref.

309* (Polarographic Investigation of the Hydrogenation Process.) **Poliarograficheskoe issledovanie gidrogenizatsionnogo protsessa. IV.** (Hydrogenation of Mixtures of Allylacetate With Bi- and Trisubstituted Ethylenes.) **Gidrogenizatsiia smesei allilatsetata s dvui trekhzameshchennymi etilenami. V.** (Hydrogenation of Mixtures of Bisubstituted Ethylene Derivitives.) **Gidrogenizatsiia smesei dvuzameshchennykh etilenovykh proizvodnykh.** A. L. Markman. *Zhurnal Obshchei Khimmi*, v. 24, no. 8, Aug. 1954, p. 1332-1355.

Treatment of fumaric-oleic, oleic-cinnamic, and oleic-maleic acid mixtures in presence of Pa or Pt catalysts. Graphs, tables. 21 ref.

Books and Miscellaneous Publications

310 Technique of Organic Chemistry. v. VI. Micro and Semimicro Methods. Nicholas D. Cheronis. 628 p. 1954. Interscience Publishers, Inc., New York. (QD271 C42m)

Methods; preparative reactions; analytical procedures.

311 Cationic Polymerisation and Related Complexes. P. H. Plesch, editor. 166 p. 1953. Academic Press, Inc., New York. (QD281.P6 P71c)

A series of 27 papers covering complexes, arylenes, and alkenes under polymerization.

312 Monomeric Acrylic Esters. E. H. Riddle. 221 p. 1954. Reinhold Publishing Corp., New York. (QD305.A2 R43m)

Properties; storage and handling; polymerization; copolymerization; reactions; analysis.

313 Heterocyclic Compounds With Indole and Carbazole Systems. Ward C. Sumpter and F. M. Miller. **Monograph Series. v. VIII. Chemistry of Heterocyclic Compounds.** 307 p. 1954. Interscience Publishers, Inc., New York. (QD331 C42)

Presents a comprehensive study of preparation, properties, and reactions reported through 1952. Deviations from the general trends of behavior are followed.

314 Synthetic Methods of Organic Chemistry. W. Theilheimer. **v. VIII.** 508 p. 1954. Interscience Publishers, New York. (QD262 T34str)

Contains a brief review of significant developments in organic synthesis. Covers techniques reported from 1951 to 1953 by starting material, product, method, and reagents.

See also:
180 (synthesis of phenol)
213 (characterization of organic acids)
787 (macromolecular research)
1396 (high molecular weight polymethylene)

CHEMISTRY—PHYSICAL

315* (Mathematical Determination of the Partial Pressures of Binary Mixtures.) **Zur rechnerischen Ermittlung der Partialdrucke von Zweistoffgemischen.** A Musil and L. Breitenhuber. *Allgemeine Wärmetechnik; Zeitschrift für wärme- und Kältetechnik*, v. 5, nos. 5-6, 1954, p. 103-108.

Two mathematical examples demonstrate process of separating the total-pressure curves into the partial-pressure curves. Includes computation of Henry's constants and composition of gas phase. Tables, graphs. 18 ref.

316 Electrochemical Behavior of Cation Exchange Membranes in Liquid Ammonia. Martha J. Bergin and Arno H. A. Heyn. *American Chemical Society, Journal*, v. 76, Oct. 5, 1954, p. 4765-4769.

Junction potentials measured in liquid NH_3, alcohol, and water. Diagram, table, graphs. 9 ref.

317 Phase Equilibria in the Condensed System Uranium Hexafluoride-Bromine Trifluoride and Uranium Hexafluoride-Bromine Pentafluoride. Jack Fischer and Richard C. Vogel. *American Chemical Society, Journal*, v. 76, Oct. 5, 1954, p. 4829-4832.

Systems are simple eutectic types. Graphs, tables. 10 ref.

318 The Hydrolysis and Aggregation of the Beryllium Ion. G. Mattock. *American Chemical Society, Journal*, v. 76, Oct. 5, 1954, p. 4835-4838.

Systems examined with glass electrode in a perchlorate medium. Graphs. 13 ref.

319 Dielectric Constants of Liquid Chlorine Trifluoride and Iodine Pentafluoride. Max T. Rogers, H. Bradford Thompson, and John L. Speirs. *American Chemical Society, Journal*, v. 76, Oct. 5, 1954, p. 4841-4843.

Constants determined from 0 to 42 C. Properties of IF_5. Diagram, table. 12 ref.

Chemistry—Physical

320* (Reactions With the Nitrogen-15 Isotope.) **Reaktionen mit dem Stickstoff-Isotop ^{15}N.** Klaus Clusius. *Angewandte Chemie*, v. 66, nos. 17-18, Sept. 7, 1954, p. 497-506.

This stable N isotope, detectable by ultra-violet spectroscopy, can show N reaction mechanisms. Diagrams, tables. 22 ref.

321* (Analysis of Phases With the Aid of Non-Aqueous Solvents. Separations in Non-Aqueous Solvents.) **Phasenanalyse unter Verwendung von nichtwässerigen Lösungsmitteln. Trennungen in nichtwässerigen Lösungsmitteln.** Bruno Sansoni. *Angewandte Chemie*, v. 66, no. 19, Oct. 7, 1954, p. 595-597.

Over 1000 experiments show extensive solubility of inorganic salts in organic solvents. Tables, graphs. 3 ref.

322 Annual Review of Physical Chemistry. G. K. Rollefoon, editor. (Annual Volume) v. 5, 1954, 540 p. Annual Reviews, Inc., Stanford, Calif. (QD453 R64a)

Includes 23 papers covering thermochemistry, thermodynamics, heterogeneous equilibria, radioactivity, spectroscopy, reaction kinetics, colloid chemistry, cryogenics, surface chemistry, and allied topics.

323 The Tabulation of Imperfect-Gas Properties for Air, Nitrogen, and Oxygen. Newman A. Hall and Warren E. Ibele. *ASME, Transactions*, v. 76, Oct. 1954, p. 1039-1054; disc., p. 1054-1056.

Deviation from perfect-gas behavior expressed fundamentally by the compressibility factor. Tables of virial coefficients, temperature derivatives, and compressibility factors. Graphs, tables. 23 ref.

324* (Action of Cation Exchangers in Acetylizations and Their Consecutive Reactions.) **L'action des échangeurs de cations dans les acétalisations et leurs réactions consécutives.** G. Victor Austerweil and R. Pallaud. *Bulletin de la société chimique de France*, 1954, no. 9, Sept., p. 1164-1167.

Discusses mechanism. 18 ref.

325 The Kinetics of the Reduction by Titanous Chloride of Azobenzene and 4-Aminoazobenzene. N. R. Large, F. J. Stubbs, and Cyril Hinshelwood. *Chemical Society, Journal*, 1954, Aug., p. 2736-2743.

Rates depend on HCl concentration. Graphs, tables. 5 ref.

326 Heats of Combustion and Molecular Structure. II. The Mean Bond Energy Term of the Carbonyl System in Certain Ketones. H. D. Springall and T. R. White. *Chemical Society, Journal*, 1954, Aug., p. 2764-2766.

Reports on diacetyl, benzil, benzyl methyl ketone, and dibenzyl ketone. Tables. 7 ref.

327 Titanium Tetrachloride as a Catalyst in the Friedel-Crafts Reaction. III. Alkylation. N. M. Cullinane and D. M. Leyshon. *Chemical Society, Journal*, 1954, Aug., p. 2942-2947.

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328 Signs of a New Pathway in Reaction Mechanism and Stereochemistry. C. K. Ingold. *Chemical Society, Journal*, 1954, Aug., p. 2991-2998 + 2 plates.

Study of normal and reactive states of C_2H_2 and C_2D_2 by spectra. Tables, diagrams. 5 ref.

329* (New Method of Measuring the Complex Dielectric Constant of Liquids in Hyperfrequency.) **Sur une nouvelle méthode de mesure de la constante diélectrique complexe des liquides en hyperfréquence.** Claude Brot. *Comptes rendus*, v. 239, no. 9, Aug. 30, 1954, p. 612-613.

Method based on study of the ratio of stationary wave created by a short-circuited section of waveguide filled with a dielectric sample, when the length of this section is varied by means of a short-circuit movable piston. 4 ref.

330* (Catalytic Layers and Their Influence on the Activation Energy.) **Kataliticheskie sloi i ikh vliianie na energiiu aktivatsii.** A. A. Balandin. *Doklady Akademii Nauk SSSR*, v. 97, no. 4, Aug. 1, 1954, p. 667-670.

Mathematical analysis. Diagram. 15 ref.

331* (Mechanism of Adsorption of Acids by Activated Carbon From Nonaqueous Solutions.) **O mekhanizme adsorptsii kislot aktivnym uglem iz nevodnykh rastvorov.** D. N. Strazhesko and B. E. Tartakovskaia. *Doklady Akademii Nauk SSSR*, v. 98, no. 1, Sept. 1, 1954, p. 107-110.

Includes graphs, table. 23 ref.

332* Infra-Red Absorption Spectra and the Hydrogen Bonding of Some Chelated Hydroxyquinones. D. Hadži and N. Sheppard. *Faraday Society, Transactions*, v. 50, Sept. 1954, p. 911-918.

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Includes graph, tables. 5 ref.

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335* An X-Ray Study of Natural Monazite. I. M. D. Karkhanavala and J. Shankar. *Indian Academy of Sciences, Proceedings*, v. 40, sec. A, Aug. 1954, p. 67-71 + 1 plate.

Monazite shows metamictization by X-ray diffraction. Tables. 6 ref.

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Theoretical and experimental investigation of cation exchange under non-equilibrium conditions. Graphs. 6 ref.

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Based on measurement of the change of resonant frequency of a cavity resonator when evacuated or filled with a gas. A F.M. technique is used in conjunction with an oscillograph display. Diagrams, tables, graph. 19 ref.

338* (Study of Systems With Concentrated Hydrogen Peroxide.) **Izuchenie sistem s kontsentrirovannoi perekis'iu vodoroda. V.** (Thermal Characteristics of Solid Phases of the $Ca(OH)_2$-H_2O_2-H_2O System.) **Termicheskaia kharakteristika tverdykh faz sistemy $Ca(OH)_2$-H_2O_2-H_2O.** S. Z. Makarov and N. K. Grigor'eva. *Izvestiia Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk*, 1954, no. 4, July-Aug., p. 598-603.

Includes graphs, tables. 4 ref.

339 Theoretical Chemistry in Russia. I. Moyer Hunsberger. *Journal of Chemical Education*, v. 31, Oct. 1954, p. 504-514.

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340 The Zero Oxidation State. Ervin Colton. *Journal of Chemical Education*, v. 31, Oct. 1954, p. 527-529.

Examples of complex cyanides, and ammine and isonitrile complexes containing transition elements in the zero oxidation state. Diagrams. 19 ref.

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Detailed mechanisms involved in formation of ions when water vapor is subjected to the action of high-energy electrons. Tables, diagrams, graph. 19 ref.

344 The Physical Structure of Asbestos. G. J. Young and F. H. Healey. *Journal of Physical Chemistry*, v. 58, Oct. 1954, p. 881-884.

Chrysotile asbestos shows twice as great an area to water vapor as to N_2 and most other gases. Tables, graphs. 7 ref.

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PoO_2 is determined by drop in dry O_2 pressure; X-ray study verifies Po(IV). 8 ref.

346* A Thermostat for Light Scattering Measurements. Edward F. Casassa and Sidney Katz. *Journal of Polymer Science*, v. 14, Oct. 1954, p. 385-389.

Description of a simple device which gives sufficiently precise regulation and provides some other advantages of an optical nature tending to enhance the accuracy of measurements. Diagrams. 4 ref.

347* (Numerical Calculation of Polarization Energy.) **Megjegyzések a polarizációs energia numerikus kiszámításához.** János Horváth. *Magyar Fizikai Folyóirat*, v. 1, 1953, p. 19-26.

Corrections are suggested for the Gombás-Neugebauer method. Application to calculation of binding energy of HCl. Table. 10 ref.

348* (Wave-Mechanical Determination of Some Constants of the HF Molecule.) **A HF-molekula néhány állandójának hullámmechanikai meghatározása.** Zsolt Náray. *Magyar Fizikai Folyóirat*, v. 1, 1953, p. 85-92.

Some characteristic constants of the HF molecule were calculated on the basis of the ion model, by means of wave-mechanical perturbation calculations. Results show good agreement with practical data. Graphs, tables. 12 ref.

349* (The Theory of the Bond of the HI Molecule.) **A HJ-molekula kötésének elméletéről.** Rezö Gáspár and Albert Kónya. *Magyar Fizikai Folyóirat*, v. 1, 1953, p. 133-144.

Statistical model of the iodine-ion; statistical perturbation calculation. Determination of potential curve, dipole momentum, and density distribution of the HI molecule. Graphs, diagrams, table. 7 ref.

350* Statistical Theory of Phase Transition. I. General Theory for Lattice Gas. II. Numerical Calculation for Lattice Gas. (English.) Ikuro Shimose. *Physical Society of Japan, Journal*, v. 9, no. 4, July-Aug. 1954, p. 451-459.

Physical interpretation of statistical properties of liquid-vapor transition. Graphs, tables. 26 ref.

351 The Approach to the Steady State in Gaseous Thermal Diffusion and Its Application to Determining the Dependence of Gas Diffusivity on the Concentration Ratio. P. T. Nettley. *Physical Society, Proceedings*, v. 67, no. 418B, Oct. 1954, p. 753-760.

Includes diagram, tables, graphs. 8 ref.

352 Monomolecular Layers and Their Applications. Eric Rideal. *Research*, v. 7, Oct. 1954, p. 384-387.

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353 An Experimental Determination of the Melting Curves of Argon and Nitrogen Into the 10000 Atm Region. D. W. Robinson. *Royal Society, Proceedings*, v. 225, ser. A, Sept. 14, 1954, p. 393-405.

Includes diagrams, graphs, table. 15 ref.

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Field produces a small increase in viscosity proportional to the square of the field. Diagrams, graphs, tables. 8 ref.

355* Studies on the Discharge Reaction in Liquid Air. III. On the Mechanisms of Nitric Oxide- and Ozone-Formation. (English.) Yôkan Nomura. *Science Reports of the Research Institutes, Tohoku University*, ser. A, v. 6, no. 2, Apr. 1954, p. 147-158.

Mechanisms of formation were examined from emission spectrum and current-wave forms in the discharge. Emission spectra, diagram, table. 22 ref.

356* (The Chemical Behavior of the Carbon Atom in the Light of Modern Quantum Theory.) **Das chemische Verhalten des Kohlenstoffatoms im Lichte der modernen Quantentheorie.** Friedrich Becker. *Umschau in Wissenschaft und Technik*, v. 54, no. 18, Sept. 15, 1954, p. 548-551.

Forces of covalent bonding and bonding molecular electron states are explained as a symmetrical overlapping of charge clouds with the electron spins in antiparallel direction. Table, diagrams. 3 ref.

357* (Connection Between Concentrations and Activities in Molten Salt Mixtures.) **Über den Zusammenhang zwischen Konzentrationen und Aktivitäten in geschmolzenen Salzmischungen.** H. Flood, T. Förland, and K. Grjotheim. *Zeitschrift für anorganische und allgemeine Chemie*, v. 276, nos. 5-6, Aug. 1954, p. 289-315.

Thermodynamics of molten salts and slags; activities; ion exchange balances. Tables, graph. 15 ref.

358* (Titanium Chlorides.) **Über Titanchloride. II.** (The Heat of Formation of Titanium^{3+} Chlorides.) **Die Bildungswärme des Titan(III)-chlorids.** Harald Schäfer, Günther Breil, and Gerhard Pfeffer. *Zeitschrift für anorganische und allgemeine Chemie*, v. 276, nos. 5-6, Aug. 1954, p. 325-332.

Includes diagrams, table. 21 ref.

359* (The Separator Tube.) **Das Trennrohr. XIII.** (Preparation of Pure, Heavy Carbon Isotope 13C.) **Reindarstellung des schweren Kohlenstoffisotops 13C.** Klaus Clusius and Hans Heinrich Bühler. *Zeitschrift für Naturforschung*, v. 9a, no. 9, Sept. 1954, p. 775-783.

Description of separator-tube installation, separating heavy methane containing 55 to 70% ^{13}C into fractions containing 3 to 6% $^{13}CH_4$ and 99 to 99.8% $^{13}CH_4$ respectively. Diagrams, tables. 15 ref.

360* (Coefficient of Vaporization of Liquid Potassium.) **Der Verdampfungskoeffizient des flüssigen Kaliums.** Kurt Neumann. *Zeitschrift für physikalische Chemie (Frankfurt)*, v. 2, nos. 3-4, Oct. 1954, p. 215-228.

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361* (Specific-Heat Measurements and Heat of Transformation of Silver Iodide.) **Messungen der spezifischen Wärme und der Umwandlungswärme von Silberjodid.** K. H. Lieser. *Zeitschrift für physikalische Chemie (Frankfurt)*, v. 2, nos. 3-4, Oct. 1954, p. 238-240.

Experimental equipment and mathematics. Graphs. 7 ref.

362* (Concept of a "Nonhomogeneous Surface" in Theories of Adsorption.) **Poniatie "neodnorodnoi poverkhnosti" v teoriiakh adsorbtsii.** V. L. Bonch-Bruevich and F. F. Vol'kenshtein. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 7, July 1954, p. 1219-1224.

Conductance electrons and structual defects as adsorptive centers. "Effective nonhomogeneity." "Function of distribution" according to adsorption temperatures. 9 ref.

363* (Methods of Calculating the Properties of Ternary Systems According to the Data for Binary Systems.) **Metody rascheta svoistv troinykh sistem po dannym dlia dvoinykh sistem.** S. D. Gromakov. *Zhurnal Fizicheskoi Khimii*, v. 28, no. 7, July 1954, p. 1257-1265.

Includes phase diagrams. 6 ref.

Chemistry—Physical

364* (Contact Transformations of Propyl Cycloheptane in the Presence of Platinized Coal.) **Kontaktnye prevrashcheniia propiltsiklogeptana v prisutsvii platinirovannogo uglia.** S. I. Khromov, E. S. Balenkova, P. A. Akishin, and B. A. Kazanskii. *Zhurnal Obshchei Khimii*, v. 24, no. 8, Aug. 1954, p. 1360-1364.

At 320 C. Tables. 7 ref.

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365 Chemistry of the Defect Solid State. A. L. G. Rees. 136 p. 1954. John Wiley and Sons, Inc., New York. (QD473 R25c)

General outline of the part played by defects in solid state reactions and considerations given to statistical thermodynamics as being most relevant to the chemical problem.

366 Atomic and Free Radical Reactions. E. W. R. Steacie. ACS Monograph Series. No. 125. v. I-II. 2nd Ed. 901 p. 1954. Reinhold Publishing Corp., New York. (QD501 St31a2)

Reviews work reported through June 1953; includes methods, bond dissociation energies, thermal and photochemical reactions, elementary reaction types, and specific reactions.

See also:
138 (differential thermal analysis)
186 (reactivity of carbon)
288 (molecular volumes of hydrocarbons)
293 (oxidation ions)
527 (reaction on thoriated cathodes)
1243 (ultrasonic absorption in organic liquids)
1376 (photochemistry of Ag halides)
1459 (physical behavior of syndets)

COATINGS

367 Stability of Acid-Resistant Red Porcelain Enamels. Roy C. Tung and Ralph L. Cook. *American Ceramic Society, Journal*, v. 37, Oct. 1954, p. 496-500.

Comparative acid resistance of a series of enamels was determined by the loss-in-wt. test and by the spot test. Tables, graphs. 9 ref.

368 Pigment Dispersion—Theory and Practice. W. H. Hoback. *American Paint Journal*, v. 39, Oct. 11, 1954, p. 72 + 8 pages.

Includes diagrams, tables, micrographs, graph. 15 ref.

369 Glycerine Alkyds Tailored to Need. III. Charles R. Bragdon. *American Paint Journal*, v. 39, Oct. 18, 1954, p. 86 + 4 pages.

Present and probable future trends in the manufacture and use of glycerine alkyds, and methods for their evaluation.

370 Tall Oil—Its Functions in the Paint Industry. III. Tall Oil in the Protective Coatings Industry. William Brushwell. *American Paint Journal*, v. 39, Oct. 25, 1954, p. 80 + 9 pages.

Chemistry of tall oil, soaps, limed oil, rosin varnishes, and styrenated tall oil. 6 ref.

371 Linseed Oil at the Surfaces of Titanium Dioxide Pigment. William R. Lasko and Lawrence S. White. *Analytical Chemistry*, v. 26, Oct. 1954, p. 1631-1635.

Fuzzy areas of electron micrographs are associated with presence of oil as a dispersant more than heterogeneous nature of the particles. Micrographs. 5 ref.

372 Surface Impregnation of Steel With Vanadium. A. N. Minkevich. *Henry Brutcher, Altadena, Calif., Translation no.* 3345, 4 p. (From book *"Surface Impregnation of Steel"*, Chapter XIII. Published by Mashgiz, Moscow, 1950.)

Effect of impregnation time in ferro-vanadium powder upon case depth of vanadized Fe. Microstructure and hardness. Tables, micrographs, graph.

373 Surface Impregnation of Steel With Nickel, Cobalt, Titanium, Zirconium, Tantalum, and Manganese. A. N. Minkevich. *Henry Brutcher, Altadena, Calif., Translation no.* 3346, 8 p. (From book *"Surface Impregnation of Steel"*, Chapter XIV. Published by Mashgiz, Moscow, 1950.)

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374* The Story of Shipbottom Protective Coatings. W. J. Francis. *Bureau of Ships Journal*, v. 3, Oct. 1954, p. 22-25.

Early research history, present uses, and future prospects for hot plastic and quick-drying vinyl coatings. Photographs.

375 "Soluton Ceramics"—New Fields in Coatings. J. Scott Griffith and S. W. Broadstreet. *Ceramic Industry*, v. 63, Oct. 1954, p. 77, 141, 143.

Spraying new ceramic solutions to heated surfaces. Remarkable resistance to thermal shock, excellent adherence, and high corrosion resistance indicate extensive applications in refractories and enameling fields. Photograph, table.

376 Asphalt Emulsions as Protective Coatings. C. C. Weeks. *Chemistry in Canada*, v. 6, Oct. 1954, p. 33-37.

Nature, properties, applications, and benefits of the emulsions in industry. Photographs.

377 Devices Developed for Accelerated Tests on High Temperature Ceramic Coatings. John V. Long. *Corrosion*, v. 10, Oct. 1954, p. 335-336.

Coatings are tested for resistance to cyclic vibration, wetting, drying, heating, and combinations of these conditions. Photographs.

378 Application Techniques, Physical Characteristics and Chemical Resistance of Polyvinyl Chlor-Acetates. *Corrosion*, v. 10, Oct. 1954, p. 349-354.

General considerations of organic coatings. Specific data on properties and variables influencing efficiency of coatings. Tables. 2 ref.

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Review of developments in coatings, service testing, fire-retardant and latex paints, epoxy resins, and silicones. 148 ref.

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New process completely seals microporosity in Mg and Al castings. Photographs.

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Study of colloid techniques; adherence; choice of bonding material. Tables, graphs, diagrams. 11 ref.

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Monographs on some 250 solvents, both British and American by trade name when appropriate. Compiles scattered and divergent data reported over the last 10 yr. of unprecedented expansion.

419 Organic Finishing Handbook. 298 p. 1954. Finishing Publications Inc., Westwood, N. J. (TS653 Or3)

Forty-four papers, on raw materials, application, types of finishes, and evaluation of protective coatings.

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See also:

268 (properties of polyesters)
303 (structure of oils and resins)
432 (spray coatings)
1020 (coating of steel wire)
1067 (optical properties of PbTe films)
1200 (structure of LiF and Cu films)
1410 (emulsions of polymeric materials)
1430 (plastic coatings)
1434 (plastic coatings)

CORROSION

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427 Corrosion Control in Industrial and Steam Power Plants. Ralph M. Lemen. *Combustion*, v. 26, Oct. 1954, p. 38-44.

Entire range of possible corrosion problems with suggested solutions, and an analysis of applicability and limitations of preventive equipment. Diagrams, photographs, tables, graph, micrograph. 3 ref.

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429 Control of Stress-Corrosion Cracking in Airframe Components. R. N. Hooker and J. L. Waisman. *Corrosion*, v. 10, Oct. 1954, p. 325-334.

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Explains the protecting effect of Mg on Fe and shows that it can be used successfully in marine equipment. Tables, diagrams, graph, photographs. 12 ref.

450 The Oxidation of Iron at 175 to 350° C. D. E. Davies, U. R. Evans, and J. N. Agar. *Royal Society, Proceedings*, v. 225, ser. A, Sept. 22, 1954, p. 443-462.

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454* (Influence of Some Inhibitors on the Rate of Solution of Carbon Steel in Nitric Acid.) **Vliianie nekotorykh zamedlitelei na skorost' rastvoreniia uglerodistoi stali v azotnoi kislote.** S. A. Balezin and G. S. Parfenov. *Zhurnal Prikladnoi Khimmi*, v. 27, no. 9, Sept. 1954, p. 930-938.

Relates solution rate and Fe electrode potential to acid concentration, temperature, and mixing. Diagram, tables, graphs. 27 ref.

455* (Corrosion of Iron in Fused-Salt Mixtures.) **Korroziia zheleza v rasplavlennykh solevykh smesiakh.** V. P. Kochergin, A. V. Kabirov, and O. N. Skorniakova. *Zhurnal Prikladnoi Khimmi*, v. 27, no. 9, Sept. 1954, p. 945-952.

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456* (Corrosion of Metals in Chlorine at Elevated Temperatures.) **Korroziia metallov pod deistviem khlora pri vysokoi temperature.** Kh. L. Tseitlin. *Zhurnal Prikladnoi Khimmi*, v. 27, no. 9, Sept. 1954, p. 953-958.

Apparatus used from 260 to 300 C. Table, graphs, diagrams. 9 ref.

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See also:

391 (corrosion theory and control)
500 (oxidation of uranium)
502 (corrosion of Cr plate)
762 (corrosion in gas turbines)
845 (corrosion by motor oils)
969 (corrosion resistance of cleaned steel)
1472 (corrosion prevention by rubber coatings)
1548 (corrosion of welded stainless steel)

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468 A Simple Mechanical Analogue for Solving Certain Power-System Stability Problems. Allan Greenwood. *Electrical Engineering*, v. 73, Oct. 1954, p. 879-884.

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469 High-Coercive-Force Permanent-Magnet Materials and Their Application. T. O. Paine and L. I. Mendelsohn. *Electrical Engineering*, v. 73, Oct. 1954, p. 891-895.

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475 A Hidden Cause of Failure in Electronic Equipment: Metal Whiskers. S. M. Arnold. *Electrical Manufacturing*, v. 54, Nov. 1954, p. 110-114.

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476 International Standards for Insulation, Motors, Components. *Electrical Manufacturing*, v. 54, Nov. 1954, p. 126-135.

Motor dimensions, temperature classification of insulating materials, tests on insulating materials, and other items. Tables. 3 ref.

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478* Self-Excited Series Transductors. D. W. Harvey. *Engineering*, v. 178, Sept. 24, 1954, p. 399-403.

Performance of single-sided, push-pull, and two-stage push-pull type transductors. Circuits, graphs, tables. 4 ref.

479 Continuity of Electricity Supply. H. Leyburn. *Institution of Electrical Engineers, Proceedings*, v. 101, pt. 1, no. 131, Sept. 1954, p. 275-283.

Trends in design and operation of electric power distribution systems. Faults. Protective systems. Graphs, diagrams, photographs.

480 The Possibilities of a Cross-Channel Power Link Between the British and French Supply Systems. D. P. Sayers, M. E. Laborde, and F. J. Lane. *Institution of Electrical Engineers, Proceedings*, v. 101, pt. 1, no. 131, Sept. 1954, p. 284-297; disc., p. 297-308.

History of channel-tunnel and submarine cable schemes. Technical problems of submarine power links. Operational and economic aspects. Tables, map, diagrams, photographs. 18 ref.

481 Electric Locomotives on the Valenciennes-Thionville Line. F. Nouvion. *Institution of Electrical Engineers, Proceedings*, v. 101, pt. 1, no. 131, Sept. 1954, p. 313-328; disc., p. 328-335.

Equipment; operating procedures; costs. Tables, diagrams, graphs.

482 Application of Magnetic Amplifiers. Robert J. Weesner. *Iron and Steel Engineer*, v. 31, Oct. 1954, p. 101-106.

Use in rolling mill controls. Photographs, graphs, diagrams.

483* The Design of Totally Enclosed Mechanical Pumps With Particular Reference to a 50 H.P. Sodium Pump. P. Fortescue. *Journal of Nuclear Energy*, v. 1, Aug. 1954, p. 5-23.

Performance of sheathed induction motors. Graphs, diagrams.

484 Precise Comparison Method of Testing Alternating-Current Watthour Meters. A. W. Spinks and T. L. Zapf. *Journal of Research, National Bureau of Standards*, v. 53, Aug. 1954, p. 95-105.

Includes circuit diagrams, photograph, tables, diagram, graph. 2 ref.

485 Selection and Application of Lever-Operated Switches. Keith A. Carlson. *Machine Design*, v. 26, Oct. 1954, p. 154-160.

Physical and electrical characteristics of multiple-circuit switches. Photographs, diagrams, tables.

486 Adjustable-Speed Electric-Motor Drives. Robert C. Rodgers. *Machine Design*, v. 26, Oct. 1954, p. 185-248.

Comprehensive design manual on selection and application. Photographs, circuits, tables, graphs, diagrams.

487 Systematic Mechanism Design. II. How to Apply New Symbolic Notation + Catalog of Basic Mechanisms. J. Denavit and R. S. Hartenberg. *Machine Design*, v. 26, Oct. 1954, p. 257-265.

Kinematic design; symbolic equations for drive intervals; block diagram interpretation; machine part design. Diagrams.

488* Study on the Induction Method of Electrical Prospecting. (English.) Takeshi Kiyano, Koichi Kirmura, and Keiichi Kobayashi. *Memoirs of the Facutly of Engineering, Kyoto University*, v. 16, no. 3, July 1954, p. 147-156.

Experimental and theoretical results on locating orebodies by electromagnetic induction. Diagrams, graphs, circuits.

489* (The Importance of the Canal Build-Up to Disruptive Discharge in Air.) **Die Bedeutung des Kanalaufbaus für den Durchschlag in Luft.** W. Köhrmann and H. Raether. *Naturwissenschaften*, v. 41, no. 17, Sept. 1954, p. 400-401.

Build-up mechanisms of static discharge between two disk-gap transmitters 1-cm. apart. Table, graphs. 7 ref.

490* Enclosures for Protecting Large Motors. G. L. Oscarson and R. J. Kolar. *Petroleum Engineer (Management Edition)*, v. 26, Oct. 1954, p. E20-E22.

Description of wide variety of types required by the many prevailing ambient conditions. Graphs, diagrams, table.

491* Studies Relating to the Use of Aluminum Conductors for Pipe-Type Cable. Joseph Sticher, Louis Meyerhoff, R. H. Hiester, and M. H. McGrath, *Power Apparatus and Systems*, 1954, no. 14, Oct., p. 1126-1141; disc., p. 1141-1143.

Properties, tests, and extensive data on Al. Diagrams, photographs, tables, graphs. 14 ref.

492* Lightning Protection in a 120-Kv Station—Field and Laboratory Studies. J. K. Dillard, H. R. Armstrong, and A. R. Hileman. *Power Apparatus and Systems*, 1954, no. 14, Oct., p. 1143-1149; disc., p. 1149-1152.

Includes graphs, tables, oscillograms. 10 ref.

493 Open-Blade Precision Snap-Action Switches. T. Y. Korsgren. *Product Engineering*, v. 25, Oct. 1954, p. 189-195.

Provide choice of manual, mechanical, or spring return with simultaneous or sequential operation of multiple circuits from a single actuator. Photographs, diagrams, tables.

494 The Complete Specification of Network by a Single Parameter. M. S. Corrington, T. Murakami, and R. W. Sonnenfeldt. *RCA Review*, v. 15, Sept. 1954, p. 389-444.

Includes diagrams, graphs, photographs, circuits. 9 ref.

495 An Integrating and Differentiating Bar-Magnet Velocity Meter for Use in Ballistocardiography. Thomas A. Perls and Charles W. Kissinger. *Review of Scientific Instruments*, v. 25, Oct. 1954, p. 983-988.

Construction details and operation. Graphs, diagrams, photograph, table, circuit. 10 ref.

496 The Microwave Gyrator—A New Circuit Element. C. L. Hogan. *Tele-Tech & Electronic Industries*, v. 13, Nov. 1954, p. 64-66, 137-140.

Cermets applied to anti-reciprocal circuit elements. Drawings, diagrams. 7 ref.

497* (Increasing the Potential on Electrostatic High-Voltage Generators.) **Spannungssteigerung an elektrostatischen Hochspannungsgeneratoren.** W. Kossel and W. Knauer. *Umschau in Wissenschaft und Technik*, v. 54, no. 18, Sept. 15, 1954, p. 564-566.

Shows that the voltage can be multiplied by surrounding the generator with a balloon-shaped casing of plastic material. Photographs, diagrams, graph.

498* (Material Transfer in Silver and Platinum Contacts.) **Die Stoffwanderung in Abhebekontakten aus Silber und Platin.** Else Holm and Ragnar Holm. *Zeitschrift für angewandte Physik*, v. 6, no. 8, Aug. 1954, p. 352-361.

Experimental and theoretical investigation of factors which limit the service life of contacts operated in air. Comparison with published results. Diagrams, tables, oscillograms. 12 ref.

Books and Miscellaneous Publications

499 The Insulation of Electrical Equipment. Willis Jackson, editor. 340 p. 1954. John Wiley & Sons, Inc., New York. (TK3401 J13i)

Structural basis of electrical and mechanical properties of insulating materials and mechanisms of dielectric permittivity, loss, and breakdown; classifications of materials for particular type of service and their applications; testing.

See also:

3 (electric generator for aircraft)
4 (aircraft deicers)
542 (manufacture of electronic subassemblies)
659 (electric power in Canada)
889 (electrical steels)
1116 (control of heavy equipment)
1357 (dielectric breakdown of mica, glass, and KCl)
1393 (dielectric properties of laminates)
1394 (plastics for insulating gears)

ELECTROCHEMISTRY AND ELECTROPROCESSES

500 The Anodic Oxidation of Uranium. (English.) O. Flint, J. J. Polling, and A. Charlesby. *Acta Metallurgica*, v. 2, no. 5, Sept. 1954, p. 696-712.

Rates of oxidation and structures of films from 2 to 100 v. Similarities of anodic and thermal oxidation. Tables, graphs, electron diffraction patterns. 13 ref.

501* (The Influences of Foreign Substances on the Capacity of the Iron Powder Electrode in the Alkaline Accumulator.) **Fremdstoffeinflüsse auf die Kapazität der Eisenpulver-Elektrode im alkalischen Akkumulator.** W. Lorenz. *Angewandte Chemie*, v. 66, no. 19, Oct. 7, 1954, p. 591-593.

Describes theory and influence of Hg, Fe (III) oxides, Mn, CaO, and Al_2O_3. 12 ref.

502 On the Corrosion Resistance of Hard Chromium Plates. H. W. Dettner. *Henry Brutcher, Altadena, Calif., Translation no.* 2573, 12 p. (From *Metalloberfläche*, v. 4, no. 3, 1950, p. A33-A37.)

Improvement in corrosion resistance of electrodeposited hard Cr by proper selection of conditions of deposition. Photographs, graphs. 13 ref.

503 Comparative Studies of Polishing Action of Phosphoric-Sulfuric and Acetic-Perchloric Acid Electrolytes. J. Heyes. *Henry Brutcher, Altadena, Calif., Translation no.* 3336, 8 p. (From *Metalloberfläche*, v. 3, no. 12, 1951, p. B179-B181.)

Previously abstracted from original. See item 5298, v. 1, May 1952.

Electrochemistry and Electroprocesses

504 Influence of Thiourea on the Electrodeposition of Nickel. L. I. Antropov and S. Ya. Popov. *Henry Brutcher, Altadena, Calif., Translation no.* 3379, 6 p. (From *Zhurnal Prikladnoi Khimii*, v. 27, no. 2, 1954, p. 206-209.)

Procedure and results of process for producing bright fine-grained Ni plates by electrodepositing on a Cu base. The possibility of using thiourea as a brightener in Ni plating baths. Graphs, micrographs. 6 ref.

505 Glutamic Acid as an Addition Agent in the Electrodeposition of Copper. S. Adamek and C. A. Winkler. *Canadian Journal of Chemistry*, v. 32, Oct. 1954, p. 931-940.

Polarization-time curves with glutamic acid shows two polarization levels. Graphs. 14 ref.

506* The Electrodeposition of Some of the Transition Metals and Their Alloys From Aqueous Solution. M. L. Holt. *Central Electrochemical Research Institute, Karaikudi, Bulletin*, v. 1, July 1954, p. 21-26.

Principles of electron shell filling are used to explain electrochemical behavior of various metals. Tables. 17 ref.

507* The Sulphamate Bath for Cadmium-Zinc Alloy Plating. T. L. Rama Char and J. Mathur. *Central Electrochemical Research Institute, Karaikudi, Bulletin*, v. 1, July 1954, p. 27-29.

Experimental data on effects of processing variables on obtaining alloys of different compositions. Graphs. 8 ref.

508* Hard Chromium Plating of Piston Rings. S. Ramachandran, S. R. Rajagopalan, and B. B. Dey. *Central Electrochemical Research Institute, Karaikudi, Bulletin*, v. 1, July 1954, p. 30-34.

Equipment and techniques for plating on cast iron. Diagrams, table. 12 ref.

509 The pH in Chlorine-Caustic Electrolysis by the Mercury Cell Process. Lars Barr. *Electrochemical Society, Journal*, v. 101, Oct. 1954, p. 497-506.

Factors effecting pH; effects of pH value on various reactions. Tables, graphs. 33 ref.

510 Factors Affecting the Formation of Anodic Oxide Coatings. M. S. Hunter and P. Fowle. *Electrochemical Society, Journal*, v. 101, Oct. 1954, p. 514-519.

Effects of electrolyte and other variables. Graphs. 10 ref.

511 Chelating Agents in Electroplating. C. D. Leonard. *Electroplating and Metal Finishing*, v. 7, Oct. 1954, p. 365, 367, 369-370.

Chemical principles and applications. Tables, graphs. 6 ref.

512 The Electrodeposition and Protective Value of Zinc-Cadmium Alloys. N. I. Kudryavtsev and E. F. Pereturina. *Electroplating and Metal Finishing*, v. 7, Oct. 1954, p. 372-375. (From *Zhurnal Prikladnoi Khimii SSSR*, v. 26, no. 2, 1953, p. 155-159.)

Factors influencing joint deposition. Corrosion resistance of various compositions. Tables, graphs.

513 Hard Anodising of Aluminium and Its Alloys. A. W. Brace. *Electroplating and Metal Finishing*, v. 7, Oct. 1954, p. 376-379.

Processes, practical applications, variations of coating properties. Tables, photographs. 18 ref.

514* Electrodeposition of Tin Alloys. J. W. Cuthbertson. *Industrial Finishing (London)*, v. 7, Oct. 1954, p. 176-183, 191.

Sn-Zn, Sn-Nn, Sn-Co, and Sn-Sb alloys are described. Photographs, tables, diagram. 11 ref.

515 Electrolytic Nickel-Clad Plate Offers Low-Cost Corrosion Protection. S. G. Bart. *Iron Age*, v. 174, Oct. 28, 1954, p. 87-89.

Properties and uses of 0.006 to 0.020 in. coatings on mild steel plate. Photographs, micrograph.

516* (Colorimetric Determination of Iron in Hard-Chromium Bath.) **Eine kolorimetrische Eisen-Bestimmung in Hartchrom-Bädern.** Heinz Pohl. *Metalloberfläche*, Ausgabe B, v. 6, no. 9, Sept. 1954, p. 129-130.

Specifications on a highly accurate method of analyzing Fe. Tables, graph. 2 ref.

517 Nickel Plating From Sulphamate Baths. Myron B. Diggin. *Metal Progress*, v. 66, Oct. 1954, p. 133-137.

Plate solutions containing an organic addition agent has compressive internal stresses, high tensile strength, and hardness without brittleness. Possible applications. Micrographs, tables, graphs.

518 Stress Effect of Iron Contamination in a Watts Type Nickel Plating Solution and Its Correlation With Endurance Limit. L. H. Curkin and R. W. Moeller. *Plating*, v. 41, Oct. 1954, p. 1154-1157; disc., p. 1157-1158.

Contractometer and interferometer measurements are correlated with fatigue limits or Ni plated alloy steel specimens. Photograph, diagram, table, graphs. 3 ref.

519 Copper-Tin Alloy Plating. W. H. Safranek and C. L. Faust. *Plating*, v. 41, Oct. 1954, p. 1159-1164, 1169-1170; disc., p. 1170.

Alloys with 17 to 50% Sn show good leveling action and corrosion resistance. Tables, micrographs, photographs. 13 ref.

520 Stress in Chromium Deposits. J. E. Stareck, E. J. Seyb, and A. C. Tulumello. *Plating*, v. 41, Oct. 1954, p. 1171-1180; disc., p. 1180-1182.

Details of spiral contractometer. Stresses in deposits from various baths on Cu and steel. Effects of heating. Photographs, micrograph, tables, diagram, graphs. 11 ref.

521 Equipment for the Study of Electrodeposition on Oxide-Soiled Surfaces. Henry B. Linford and David O. Feder. *Plating*, v. 41, Oct. 1954, p. 1183-1187.

Details of equipment and techniques for studying plating phenomena under closely controlled conditions. Table, photographs, diagrams. 5 ref.

522 Electropolishing Titanium. Sakae Tajima and Takemi Mori. *Products Finishing*, v. 19, Oct. 1954, p. 26-30 and 32.

Bath compositions. Operating procedures. Diagrams, tables. 4 ref.

523 Chrome Plating of Gun Bores. G. Fred Gurnham. *Products Finishing*, v. 19, Nov. 1954, p. 56 + 4 pages.

Process for 90 mm.x 15 ft. gun barrel from receipt to final finishes.

524* (Crystallization Overvoltages.) **Kristallisationsüberspannungen.** Wolfgang Lorenz. *Zeitschrift für Naturforschung*, v. 9a, no. 9, Sept. 1954, p. 716-724.

Theory of overvoltage phenomena on electrodes where the crystallization processes are determined by the velocity. Stationary current voltage curves and polarization impedance. 14 ref.

525* (Microscopic Observation of the Anode Process During Electrolytic Polishing of Duralumin.) **Mikroskopicheskoe nabliudenie anodnogo protsessa pri elektrolitícheskoi polirovke diuraliumina.** A. Sh. Valeev. *Zhurnal Prikladnoi Khimii*, v. 27, no. 9, Sept. 1954, p. 939-944.

In mixture of H_2SO_4, H_3PO_4, and H_2CrO_4. Formation of film in anodal zone. Adsorption by polished surface. Diagram. 13 ref.

Books and Miscellaneous Publications

526 (Practical Electrochemistry. Principles and Technology.) **Praktische Elektrochemie. Grundlagen und Technologie.** Viktor Gaertner. 512 p. 1952. Verlag für Jugend und Volk, Gesellschaft M.b.h., Vienna. (QD553 G11p)

Industrial applications in refining, electroplating, metallurgy; dissociation and synthesis; thermoelectric distillation; gas discharges; electro-osmosis.

See also:

146 (glass electroplating equipment)
453 (electrochemical behavior of NiO films)
805 (stresses in electrodeposits)
967 (electropolishing of stainless steel)
1029 (electrolytic polishing)
1469 (analysis of metal-finishing wastes)

ELECTRONICS

527 The Reaction Occuring on Thoriated Cathodes. Michael Hoch and Herrick L. Johnston. *American Chemical Society, Journal*, v. 76, Oct. 5, 1954, p. 4833-4835.

Vapor pressure of ThO_2 measured from 2398 to 2677 K. Diagram, graph, tables. 13 ref.

528 Numerical Control—What It Means to Metalworking. William M. Stocker, Jr. and Charles D. Emerson. *American Machinist*, v. 98, Oct. 25, 1954, p. 133-156.

Detailed discussion of complete automatization by electronic controls. Examples of complex operations in various fields of metal fabrication. Photographs, diagrams, tables.

529* (The Importance of Chemically Pure Initial Substances for the Solid Body Research.) **Die Bedeutung chemisch reiner Ausgangsstoffe für die Festkörperforschung.** F. Trendelenburg. *Angewandte Chemie*, v. 66, nos. 17-18, Sept. 7, 1954, p. 520-524.

Discusses semiconductor mechanisms; performance of elements in periodic groups III and V; and magnetic barrier layer effect in Ge. Diagrams, graphs. 8 ref.

530* (Aircraft Built-In Antennas for Meter Waves.) **Antennes encastrées pour avions, sur ondes métriques.** Siegfried Zisler. *Annales des Télécommunications*, v. 9, nos. 7-8, July-Aug. 1954, p. 205-214.

Examines how essential qualities of an antenna vary as a function of its dimensions and its distance to a reflection. Presents model for the 115 to 130 Mc. per sec. frequency range, with a radiation diagram adapted to the homing system. Graphs, diagrams, photographs. 2 ref.

531* (Response of Radioelectric Spectra Analyzer With Nonperiodic Morse Signals.) **Réponse des analyseurs de spectres radioélectriques a des signaux Morse non périodiques.** Jean Marique. *Annales des Télécommunications*, v. 9, nos. 7-8, July-Aug. 1954, p. 215-223.

Presents principles making it possible to interpret and use the response of a radioelectric spectra analyzer under the effect of a telegraphic message. Graphs, tables, diagrams, circuit. (To be continued.)

532* (Magnetic Demodulation in Sinusoidal High-Frequency Induction Current.) **Magnetische Demodulation bei sinusförmigem Verlauf des hochfrequenten Induktionsflusses.** Gerhard Meinshausen. *Archiv der elektrischen Übertragung*, v. 8, no. 9, Sept. 1954, p. 373-386.

Obtained sinusoidal waveform of the induction flux, higher power and lower distortion of the demodulated audio-frequency signal. Diagrams, graphs, oscillograms. 5 ref.

533 (Coupling-In and -Out of Coaxial Laminated Transmission Lines.) **Die An- und Auskopplung von koaxialen Schichtenleitungen.** Heinrich Kaden and Horst-Edgar Martin. *Archiv der elektrischen Übertragung*, v. 8, no. 9, Sept. 1954, p. 387-403.

Analysis of fundamental and higher-order modes resulting in coupling losses. Diagrams, graphs, tables.

534 Feedback Filters for 2-Channel Amplifiers. N. H. Crowhurst. *Audio*, v. 38, Oct. 1954, p. 32-33, 95.

Use of crossover networks yields L.F. and H.F. slopes of optimum values without inductors. Circuits.

535 A Transistor Phonograph Pre-Amplifier for Magnetic Pickups. Basil T. Barber. *Audio*, v. 38, Oct. 1954, p. 38-40, 99.

Complete instructions for building pre-amplifier with miniscule power requirements, analysis of performance and data on transistor circuits for audio use. Circuits, graphs. 5 ref.

536* Direct Simulation Bypasses Mathematics, Simplifies Analysis. Vernon L. Larrowe. *Control Engineering*, v. 1, Nov. 1954, p. 25-31.

Concept of building computer circuits which are direct analogs of components of simulated system. Circuits, diagrams.

537* 31 Ways to Multiply; How to Pick Them, How to Use Them. Sidney A. Davis. *Control Engineering*, v. 1, Nov. 1954, p. 36-46.

Summation mechanical, electromechanical, and electronic equipment. Tables, circuits, diagrams, drawings. 5 ref.

538* (Certain Patterns in the Magnitude of the Thermal Conductivity of Semiconductors.) **Nekotorye zakonomernosti v velichine teploprovodnosti poluprovodnikov.** A. V. Ioffe and A. F. Ioffe. *Doklady Akademii Nauk SSSR*, v. 97, no. 5, Aug. 11, 1954, p. 821-822.

Effect of at. and ionic crystal lattice structure on thermal conductivity of various halide, Ge, Si, In, and Sb semiconductors. Tables, graphs. 2 ref.

539 The Use of Screen-to-Plate Transconductance in Multigrid Tube Circuit Design. K. A. Pullen, Jr. *Electrical Engineering*, v. 73, Oct. 1954, p. 876-879.

Selection of triodes and multigrid vacuum tubes for specific applications may be systematized. Graphs, table. 13 ref.

540 Small-Signal Parameters for Transistors. P. L. Pritchard. *Electrical Engineering*, v. 73, Oct. 1954, p. 902-905.

Performance of transistors can be determined with equal facility from any set of parameters provided. Diagrams, tables. 22 ref.

541 How to Determine Response Time of Magnetic Amplifiers. L. J. Johnson and S. E. Rauch. *Electrical Manufacturing*, v. 54, Oct. 1954, p. 90-94.

Special charts reveal the minimum response times afforded by various designs. Diagram, oscillogram. 10 ref.

542 Mass Production of Electronic Subassemblies. A. Arnold Lawson. *Electrical Manufacturing*, v. 54, Oct. 1954, p. 134-137.

Completely automatic system for placement of components on printed circuit wafers. Punched tape signals and servomechanisms are used for program control. Photographs.

543 Adapting Digital Techniques for Automatic Controls. I. Bernard M. Gordon. *Electrical Manufacturing*, v. 54, Nov. 1954, p. 136-143, 332.

Includes diagrams, circuits. 1 ref.

544 The Voltage Ratio and Output Impedance of a Ladder Network Composed of *n* Similar Elements. T. S. Fox and K. R. Sturley. *Electronic Engineering*, v. 26, Oct. 1954, p. 447-448.

Mathematical analysis. Circuits.

545 A Simple Direct Reading Thermistor Bridge. D. C. Cooper. *Electronic Engineering*, v. 26,, Oct. 1954, p. 448-451.

Design of simple circuit which gives direct reading of power and does not require calibrating. Circuits, photograph, graphs.

546 Mechanical Design of Electronic Equipment. John M. Carroll. *Electronics*, v. 27, Oct. 1954, p. M1-M64.

Designing the chassis; making small parts; shielding and potting; moving parts; power devices; assembly techniques; wiring and soldering; and designing the cabinet. Photographs, diagrams, graphs, tables.

547 Precision Potentiometers Use New Materials. Frank Rockett. *Electronics*, v. 27, Oct. 1954, p. 144-151.

Resistance elements made from deposited metallic films, conductive plastics, or lossy liquid dielectrics give infinite resolution, greatly increasing the scope of applications. Other new design and construction techniques. Photographs, diagrams, graph.

548 Germanium Modulator for Infrared Communication. Alan F. Gibson. *Electronics*, v. 27, Oct. 1954, p. 155-157.

Transparency of Ge to infra-red radiation is controlled by injection of charge carriers to provide direct modulation of light beam. Typical design example for audio frequency modulator having response three decibels down at 10 kc. Diagrams. 5 ref.

Electronics

549 Regulated D-C Supply Has High Efficiency. *Electronics*, v. 27, Oct. 1954, p. 165-167.

Two-hundred-watt power supply uses magnetic amplifiers to regulate slow line-voltage and load changes and electronic circuitry to regulate rapid changes. Technique may be applied to regulation of d.c. generators as well as rectifier power supplies. Circuit diagrams.

550 Fast-Response Magnetic Servo Amplifier. Frank Hill and Joseph A. Fingerett. *Electronics*, v. 27, Oct. 1954, p. 170-173.

Performance of vacuum-tube amplifiers is approached by cascaded high-speed magnetic amplifiers for servo systems. Three-stage unit responds in less than half cycle of supply-voltage frequency, permitting use of error-rate feedback for stabilization. Tables, photograph, circuits.

551 High-Speed Counting With One-Tube Decades. R. E. Nather. *Electronics*, v. 27, Oct. 1954, p. 175-177.

Includes circuits, photographs. 2 ref.

552 Magnetic Recorder Arrests Transients. Max Hoberman. *Electronics*, v. 27, Oct. 1954, p. 178-181.

Single wave form on magnetic disk can be played back for oscillographic analysis giving corresponding frequency function from parameters of the time function. Photograph, graph, circuits. 3 ref.

553 Automatically Plotting Electrostatic Field Lines. David H. Andrews. *Electronics*, v. 27, Oct. 1954, p. 182-183.

Continuous equipotential lines representing electric field patterns are plotted with 2% accuracy on resistive paper. Photographs, diagram. 3 ref.

554 Operation of CRT Storage Devices. Stanley Winkler and Seymour Nozick. *Electronics*, v. 27, Oct. 1954, p. 184-187.

How to obtain optimum operating conditions with various storage tubes. Photographs, circuits, table.

555 Iron-Core Transformers Run Smaller and Hotter. Frank Rockett. *Electronics*, v. 27, Nov. 1954, p. 136-142.

New core materials, coatings, and dielectrics provide miniaturization and high-temperature operation. Photographs.

556 Electrostatic Speaker Accents High Frequencies. Marvin Hobbs. *Electronics*, v. 27, Nov. 1954, p. 143-145.

Construction and properties. Photographs, circuit, graphs.

557 Decade Counter Tube for Accounting Machines. R. B. Koehler and R. K. Richards. *Electronics*, v. 27, Nov. 1954, p. 151-153.

Application of gas-discharge tube. Photograph, drawings, table, circuit. 12 ref.

558 Microwave Applications of Gas Discharges. Frank R. Arams. *Electronics*, v. 27, Nov. 1954, p. 168-172.

Control of microwaves. Diagrams, graphs, table. 16 ref.

559* (Transistor-Circuit Technique in Low-Frequency Amplifiers.) **Transistoren-Schaltungstechnik in Niederfrequenzverstärkern.** J. Vith. *Elektrotechnische Zeitschrift*, v. 75, Ausgabe A, no. 18, Sept. 1954, p. 591-594.

Variations for different requirements. Compensating circuits for balancing temperature and other operating conditions. Diagrams, table, graph. 6 ref.

560* (Current Rectifiers.) **Stromrichter.** A. Partzch. *Elektrotechnische Zeitschrift*, v. 75, Ausgabe A, no. 18, Sept. 1954, p. 612-614.

Mercury-vapor, mechanical, and dry-disk rectifiers of Se and Ge. 15 ref.

561* (Expansion of Electromagnetic Waves, Radio-Direction Finding, and Radio Astronomy.) **Ausbreitung elektromagnetischer Wellen, Funkortung und Radioastronomie.** E. Roessler. *Elektrotechnische Zeitschrift*, v. 75, Ausgabe A, no. 18, Sept. 1954, p. 632-635.

General review of literature on various fields of radio technology. 73 ref.

562* (Electron Tubes.) **Elektronenröhren.** W. Kleen. *Elektrotechnische Zeitschrift*, v. 75, Ausgabe A, no. 18, Sept. 1954, p. 641-643.

Electronic tubes used in television, radio, direction finders, and automatic computers. 35 ref.

563* (Semiconductors.) **Halbleiter.** K. Siebertz. *Elektrotechnische Zeitschrift*, v. 75, Ausgabe A, no. 18, Sept. 1954, p. 643-644.

Literature on materials and structure of semiconductors, rectifiers, transistors, and behavior of semiconductors in a magnetic field. 54 ref.

564* Plastic Film Capacitors. P. O. Harris. *Ericsson Review*, 1954, no. 2, p. 56-61.

Describes capacitors and their properties in the form in which they are manufactured by Rifa. Photographs, diagram, graphs.

565* (Coaxial Plug-In Connections for Communications Technology.) **Koaxiale Steckverbindungen für die Nachrichtentechnik.** H. Larsen and F. Haas. *Frequenz*, v. 8, no. 9, Sept. 1954, p. 267-276.

General requirements and details of construction. Diagrams, photographs, tables, graphs.

566* (Quarter-Wave Coupling Transformer as an Adjusting and Coupling Element for Microwaves.) **Der *Lambda*-Viertel-Transformationsschieber als Abstimm- und Koppelelement für Mikrowellen.** C. Colani. *Frequenz*, v. 8, no. 9, Sept. 1954, p. 276-278.

Properties and advantages. Diagrams, graphs.

567* (Influence of Circular Cavities on the Space-Charge Waves of Velocity-Modulated Currents.) **Beeinflussung der Raumladungswellen von Schwankungsströmen durch Schwingungskreise.** Klaus Pöschl. *Frequenz*, v. 8, no. 9, Sept. 1954, p. 284-288.

Application to the two-cavity klystron. 10 ref.

568* (Measurements on Coaxial Cables.) **Messungen an Koaxialkabeln.** A. Knacke. *FTZ; Fernmeldetechnische Zeitschrift*, v. 7, no. 8, Aug. 1954, p. 387-393.

Fault measurement and test results obtained in practice. Diagram, graphs. 8 ref.

569* (Direct-Recording High-Accuracy Frequency Meters.) **Direkt zeigende Frequenzmesser hoher Genauigkeit.** J. Hacks. *FTZ; Fernmeldetechnische Zeitschrift*, v. 7, no. 8, Aug. 1954, p. 394-398.

Frequency and cycle measuring equipments are described, which utilize electronic counters. Diagrams, table, photographs.

570* (Non-Contacting Plungers for Microwave Measuring Instruments.) **Kontaktlose Kolben für Mikrowellen-Messgeräte.** J. Deutsch and O. Zinke. *FTZ; Fernmeldetechnische Zeitschrift*, v. 7, no. 8, Aug. 1954, p. 419-424.

Design of gap plungers for tuning cavity resonators. Diagrams, graphs. 3 ref.

571* (Special Time Expansion Processes in Electron-Ray Oscillographs.) **Besondere Zeitdehnungsverfahren bei Elektronenstrahl-Oszillografen.** J. Czech. *FTZ; Fernmeldetechnische Zeitschrift*, v. 7. no. 8, Aug. 1954, p. 425-430.

Sweep expansion for examination of impulses. Diagrams, oscillograms. 9 ref.

472 Beam Deflection Color Television Picture Tubes. James M. Lafferty. *I.R.E., Proceedings*, v. 42, Oct. 1954, p. 1478-1495.

Fundamental principles of color-switching at the screen by retarding or accelerating fields with a single electron beam. Diagrams, graphs, micrograph, photographs. 10 ref.

573 Characteristics of a Transmission Control Viewing Storage Tube With Halftone Display. M. Knoll, H. O. Hook, and R. P. Stone. *I.R.E., Proceedings*, v. 42, Oct. 1954, p. 1496-1504.

Tube maintains a bright visual display, using a charge pattern stored on an insulating layer to grid control the transmitted viewing beam. Photographs, diagrams, graphs. 22 ref.

574 IRE Standards on Electron Devices: Definitions of Semiconductor Terms, 1954. *I.R.E., Proceedings*, v. 42, Oct. 1954, p. 1505-1508.

Definitions of terms used in semiconductor research and applications.

575 A Simple Microwave Correlator. R. H. Wilcox. *I.R.E., Proceedings*, v. 42, Oct. 1954, p. 1512-1515.

A simple correlator employing the ring modulator circuit as a rapid-response multiplier which accepts signals on coaxial cables and which is usable over a wide range of microwave frequencies. Diagrams, graphs. 4 ref.

576 A New Transducer Diagram. R. N. Bracewell. *I.R.E., Proceedings*, v. 42, Oct. 1954, p. 1519-1521.

Simple diagram consisting of two graduated straight lines and a point, completely represents a loss-free transducer. Diagrams.

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Conductor, laminated and insulated at right angles to flow of the current, has low effective skin-effect resistance. Diagrams.

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By proper design of trapping electrode, transmission through a drift space was improved from 12 to 80%. Diagrams, graphs. 5 ref.

579 Weighting Functions for Time-Varying Feedback Systems. J. A. Aseltine and R. R. Favreau. *I.R.E., Proceedings*, v. 42, Oct. 1954, p. 1559-1564.

Method is presented for the synthesis of the adjoint system for a given linear time-varying feedback system. Diagrams. 8 ref.

580 Analysis of Propagating Modes in Dielectric Sheets. Leonard Hatkin. *I.R.E., Proceedings*, v. 42, Oct. 1954, p. 1565-1568.

Includes diagrams, graphs. 5 ref.

581 Analysis of Helical Transmission Lines by Means of the Complete Circuit Equations. Vernon J. Fowler. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Antennas and Propagation*, v. AP-2, no. 4, Oct. 1954, p. 132-143. (TK1 In6.6ap)

Includes diagrams, graphs. 8 ref.

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Includes diagrams, graphs. 10 ref.

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584 A Developmental Voltage-Tunable Microwave Magnetron. Jules S. Needle. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Electron Devices*, v. ED-1, no. 3, Aug. 1954, p. 18-28. (TK1 In6.6ed)

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585 Measurement of Klystron Amplifier Parameters. C. M. Veronda. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Electron Devices*, v. ED-1, no. 3, Aug. 1954, p. 29-34. (TK1 In6.6ed)

Includes photograph, graphs, circuit. 6 ref.

586 Transistors and Their Applications. A Bibliography, 1948-1953. Alan R. Krull. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Electron Devices*, v. ED-1, no. 3, Aug. 1954, p. 40-77. (TK1 In6.6ed)

Comprehensive listing.

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Design of point-type transistor switching circuits to handle relatively large direct currents (of the order of several tens of milliamp.) can be handled with drop of one of two v. Circuit diagrams, graphs. 7 ref.

588 The Measurement of the Small-Signal Characteristics of Transistors. E. H. Cooke-Yarborough, C. D. Florida, and J. H. Stephen. *Institution of Electrical Engineers, Proceedings*, v. 101, pt. 3, no. 73, Sept. 1954, p. 288-293; disc., p. 308-313.

Measurements on point-type transistors over a wide range of emitter currents, including those of less than 1 μA. Circuit diagrams, graphs. 5 ref.

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Measurement of L.F. parameters of junction transistors under emitter open-circuit and collector short-circuit conditions. Circuit diagrams, tables.

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Measurements at widely differing frequencies of the noise produced when the diodes are excited by d.c. bias. Graphs. 20 ref.

593 The Comparison and Calibration of Power-Measuring Equipment at Wavelengths of 3 Cm and 10 Cm. R. A. Bailey, H. A. French, and J. A. Lane. *Institution of Electrical Engineers, Proceedings*, v. 101, pt. 3 no. 73, Sept. 1954, p. 325-329.

Discussion of substandard thermistor bridges. Tables, diagrams, graphs. 5 ref.

594 Recording Rapid Weight Changes. Floyd A. Mauer. *Instrumentation*, v. 7, no. 4, 1954, p. 36-37.

Application of chart records to analytical balance. Photographs, diagram, graph.

595 Solving Process-Control Problems by Analog Computer. R. J. Medkeff and H. Matthews. *Instruments and Automation*, v. 27, Oct. 1954, p. 1624-1626.

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597 The Effect of a Transverse Electric Field on Carrier Diffusion in the Base Region of a Transistor. J. S. S. Kerr, J. S. Schaffner, and J. J. Suran. *Journal of Applied Physics*, v. 25, Oct. 1954, p. 1293-1297.

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Electronics

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600* (Semi-Conductive Complexes, Thermistors. Some Applications.) **Complexes semi-conducteurs, thermistances. Quelques applications.** J. Millet. *Métaux, Corrosion-Industries*, v. 29, nos. 347-348, July-Aug. 1954, p. 292-302.

Electrical and thermal properties. Diagrams.

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(Translated from the French.) Derivation of functions. Graphical representations. Operation of relay servomechanism with a dead zone. Diagrams, graphs.

602* (Engineering Computation of High-Power Pulse Transformer.) **Über die ingenieurmässige Berechnung von Hochleistungs-Impulstransformatoren.** P. N. Matchanow. *Nachrichtentechnik*, v. 4, no. 8, Aug. 1954, p. 338-344.

Design data; characteristics. Shape of pulse and degree of efficiency. Diagrams, graphs. 2 ref.

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Device is a control for investigating pulsed equipment. Indicates problems of pulse amplifier and transmitter. Evaluates results from a similar industrial device. Diagrams, graphs, photographs. 7 ref.

604* (Design of a High-Frequency Differential Set-Up for Measuring Losses in Ferrite and Powdered-Core Coils.) **Aufbau eines Hochfrequenzdifferentialmessplatzes zur Verlustmessung an Ferrit- und Massekernspulen.** G. Hiller. *Nachrichtentechnik*, v. 4, no. 8, Aug. 1954, p. 353-358.

Characteristics, sensitivity, and accuracy of differential measuring bridge. Data on H.F. resistor, standard condenser, and other bridge parts. Principles of determining hysteresis, eddy-current, and after-effect losses in ferromagnetic cores. Diagrams, photograph, graphs. 15 ref.

605* (High-Frequency Energy Coil Cables.) **Hochfrequenz-Energie-Ölkabel.** F. Hahn. *Nachrichtentechnik*, v. 4, no. 8, Aug. 1954, p. 363-365.

Description of transformer-oil-filled coaxial disk cables to transmit short and ultra-short waves from television station to transmitting tower. Photographs, tables, diagrams, graph. 2 ref.

606 Diode Amplifier. *National Bureau of Standards, Technical News Bulletin*, v. 38, Oct. 1954, p. 145-148.

Semiconductor amplifier offers important applications in computers and other electronic devices. Circuits.

607 Anodically Produced Multiple Oxide Films for Increasing the Reflectance of Evaporated Aluminum. Georg Hass and Alan P. Bradford. *Optical Society of America, Journal*, v. 44, Oct. 1954, p. 810-815.

Includes graphs, diagrams, tables. 10 ref.

608 Simulator for Calculating the Reflectance and Transmittance of Multilayer Interference Films. S. M. MacNeille and E. O. Dixon. *Optical Society of America, Journal*, v. 44, Oct. 1954, p. 805-809.

Network analogue computor. Diagrams, circuits, photograph, graphs. 5 ref.

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Design and properties of tubes ranging from a "micro-second" flash tube to a tube which dissipates 10,000 joules in a flash lasting a few milliseconds. Photographs, graphs, diagrams. 8 ref.

610 An Experimental Photoconductive Camera Tube for Television. L. Heijne, P. Schagen, and H. Bruining. *Philips Technical Review*, v. 16, July 1954, p. 23-25.

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Study to examine relationship to ion burn. Graphs, photographs, diagrams.

612* Measurements on Current Noise in Carbon Resistors and in Thermistors. (English.) K. M. Van Vliet, C. J. Van Leeuwen, J. Blok, and C. Ris. *Physica*, v. 20, no. 8, Aug. 1954, p. 481-496.

Includes diagram, circuit, graphs, tables. 27 ref.

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Lithium migrates as a singly-charged positive ion in single crystals of both Ge and Si in temperature ranges of 150 to 600 and 360 to 860 C, respectively. Diagrams, graph, table, photograph. 8 ref.

614* Electrical Properties of Silicon Containing Arsenic and Boron. F. J. Morin and J. P. Maita. *Physical Review*, v. 96, ser. 2, Oct. 1, 1954, p. 28-35.

Electrical conductivity and Hall effect were measured from 10 to 1100 K. Graphs, table. 9 ref.

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Hall effect and resistivity measurements were made on single crystals. Diagram, graphs. 13 ref.

616* (Physical Principles of the Action of Crystal Diodes and Triodes.) **Fizicheskie osnovy deistviia kristallicheskikh diodov i triodov.** N. Penin. *Radio*, 1954, no. 8, Aug., p. 18-20.

Structure of Ge crystal lattice. Electrical conductivity of ideal semiconductors and those containing impurities. Diagrams.

617* (A New Crystal Triode.) **Novyi kristallicheskii triod.** I. Breido. *Radio*, 1954, no. 8, Aug., p. 20-22.

Constructed of Ge plate with metal layer on each side, called "flat-contact" type; 6 Mc. bandwidth. Diagrams, graphs, circuits.

618* (Machine for Winding Coils of the "Universal" Type.) **Stanok dlia namotki katushek "Universal' ".** A. Zelichenko. *Radio*, 1954, no. 8, Aug., p. 54-57.

Detailed construction drawings and description of operation. Diagrams.

619* Electronic Thickness Gages. *Radio-Electronic Engineering*, v. 23, Nov. 1954, p. 10-11, 30-31.

Three types of gages developed at National Bureau of Standards. Photographs, circuits.

620* The Phantastron. William L. Roberts. *Radio-Electronic Engineering*, v. 23, Nov. 1954, p. 12-14, 32.

Produces a controllable square wave. Circuits.

621 Zero-Reference and Alignment. *Radio-Electronics*, v. 25, Nov. 1954, p. 36-37.

Use of oscilloscope. Oscillograms, diagram.

622 Sine-Wave Square-Wave Generator. Frank J. DiElsi. *Radio-Electronics*, v. 25, Nov. 1954, p. 46-47.

Wide frequency range and extremely stable output. Photographs, circuit.

623 The Phototransistor. Harry Mileaf. *Radio-Electronics*, v. 25, Nov. 1954, p. 96, 98, 100, 102.

Characteristics, operations, and applications. Diagrams, circuits, graphs.

624 Studies of the Interface Layer in Oxide Cathodes. L. S. Nergaard and R. M. Matheson. *RCA Review*, v. 15, Sept. 1954, p. 335-361.

New data on interface effects in commercial tubes and complex nature of interface layers. Diagrams, graphs, tables. 21 ref.

625 Wide-Band Amplitude Distribution Analysis of Voltage Sources. Lyman W. Orr. *Review of Scientific Instruments*, v. 25, Sept. 1954, p. 894-898.

Includes circuit diagrams, oscillograms.

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Analyzer allows rapid measurement of flicker noise in vacuum tubes; incorporates a quadratic thermistor-detector circuit with a d.c. voltmeter of variable time constant and wide-band filter circuits. Circuit diagrams, diagram. 2 ref.

627* Automatic Digital Computers in Industrial Research. IV. R. F. Clippinger, B. Dimsdale, and J. H. Levin. *Society for Industrial and Applied Mathematics, Journal*, v. 2, June 1954, p. 113-131.

Description of problems classified by ratio of data handling to computing operations.

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Two permanent magnets in conjunction with toroidal coil to produce continuously adjustable biasing field. Photograph, graphs, diagrams.

629 Tube Selection Increases Signal Capacity of TV Receivers. Robert G. Horner. *Tele-Tech & Electronic Industries*, v. 13, sec. 1, Oct. 1954, p. 70-71, 132-133.

Quality check of I. F. tubes enables a thirty-fold increase in signal handling capacity. One hundred tube test station provides tubes for production of 700 receivers daily. Graphs, circuit diagrams.

630 Thermoplastic Insulated Tri-Axial Pulse Cables. Jack Spergel and Milton Tenzer. *Tele-Tech & Electronic Industries*, v. 13, sec. 1, Oct. 1954, p. 74-76, 146-147.

Power handling capabilities up to 40 megawatts are in sight with cable using polyethylene dielectric and noise shield. Diagram, graphs, tables.

631 Transistor Reliability in Low Power Audio Ues. F. M. Dukat. *Tele-Tech & Electronic Industries*, v. 13, sec. 1, Oct. 1954, p. 77-79, 130-131.

Analysis of field failures in quantity produced transistors for first year of service in hearing aids. Two per cent predicted as realistic industry reliability figure. Graph, tables. 2 ref.

632 Designing a High Speed Relay. A. F. Bischoff. *Tele-Tech & Electronic Industries*, v. 13, sec. 1, Oct. 1954, p. 84-86, 134-136.

Development of impulse type polarized relay required simple armature capable of high speed, bounce-free operation at 5,000 c.p.s. Photograph, diagrams.

633 New Developments at Bureau of Standards. V. *Tele-Tech & Electronic Industries*, v. 13, sec. 1, Oct. 1954, p. 144 + 7 pages.

Calibrating vibration pickups and accelerometers. Diode amplifiers. Flip-flop circuits. Photographs, circuit diagrams.

634 Broad Applications for New Transducer. *Tele-Tech & Electronic Industries*, v. 13, Nov. 1954, p. 67, 160, 162-163.

Use of generated d.c. voltage on electrodes in gas discharge tube by H.F. field. Circuits, photographs.

635 Electron Tube Grid Currents. *Tele-Tech & Electronic Industries*, v. 13, Nov. 1954, p. 70-72, 153-156.

Analysis of circuits for reliability. Circuits, graphs.

636* A New Statistical Analyzer Simplifies Inspection and Quality Control. H. Dean Voegtlen. *Tooling and Production*, v. 20, Oct. 1954, p. 66-68, 182 .

Analyzer classifies data from standard inspection and test equipment. Diagrams, graph.

637* Flat-Earth Transformation and Its Mathematical Interpretation From Spherical-Earth Geometry. R. N. Ghose. *Trend in Engineering, (University of Washington)*, v. 6, Oct. 1954, p. 16-19.

Discussion of the problem of determining the field intensity of V.H.F. and U.H.F. radio waves in a region well beyond the line of sight. Diagrams. 4 ref.

638* (Modern Thermionic Cathodes.) **Sovremennye termoelektronnye katody.** N. D. Morgulis. *Uspekhi Fizicheskikh Nauk*, v. 53, no. 4, Aug. 1954, p. 501-543.

Survey of metallic and non-metallic cathodes and oxide, carbide, and boride coatings. Graphs, tables, diagrams. 70 ref.

639* (Nickel in the Manufacturing of Oxide Cathodes.) **Le nickel dans la fabrication des cathodes à oxydes.** Jean Challansonnet. *Vide*, v. 9, no. 51, May, 1954, p. 22-27.

Survey of French and European work on use of Ni alloys in electron tubes. Tables, phase diagrams.

640* (Experimental Results on the Behavior of Nickel Cathodes Heated in a Vacuum.) **Résultats expérimentaux sur le comportement du nickel pour cathodes, chauffé sous vide.** J. Richard. *Vide*, v. 9, no. 51, May 1954, p. 28-32.

Analysis of gases and volatile material involved from Ni when heated in a vacuum. Tables, graphs.

641* (The Influence of the Physical and Chemical Properties of the Coating on the Emission From the Oxide Cathode.) **L'influence des propriétés physiques et chimiques des couches sur l'émission des cathodes.** D. A. Wright. *Vide*, v. 9, no. 51, May 1954, p. 58-69.

Includes graphs, diffraction photographs, micrographs. 6 ref.

642* L.F. Noise in Resistors. Noel B. Montagnon. *Wireless Engineer*, v. 31, Oct. 1954, p. 255-263.

Theories, method of measuring, and equipment. Tables, circuits, graphs. (To be continued.)

643* Magnetic Recording for Purposes Other Than Entertainment. H. G. M. Spratt. *Wireless World*, v. 60, Oct. 1954, p. 508-511.

Data recording for medical and other applications. 15 ref.

644* Transistor H.T. Generator. D. L. Johnston. *Wireless World*, v. 60, Oct. 1954, p. 518.

Description of replacement unit for hearing aid high voltage batteries. Photograph, circuit diagram.

645* (A Low Potential Oscillator for Measuring the Deflective Capacitance of Sensitive Rotating Elements.) **Ein Oszillator mit kleiner Spannungsamplitude zur kapazitiven Messung des Ausschlages empfindlicher Drehsysteme.** Julius W. Hiby and Klaus G. Müller. *Zeitschrift für angewandte Physik*, v. 6, no. 8, Aug. 1954, p. 361-363.

Oscillator circuit which can serve as a micrometer capacitor. Graphs, circuit diagram. 2 ref.

646* (Behavior of Gas-Filled Photocells in the Range of Independent Discharge.) **Das Verhalten gasgefüllter Photozellen im Gebiet der selbständigen Entladung.** Werner Kluge and Arno Schulz. *Zeitschrift für angewandte Physik*, v. 6, no. 8, Aug. 1954, p. 364-370.

Photocells can be operated with the usual cathodes; instabilities are due to reversible fatique phenomena, but KH photocathodes have low fatigue susceptibility. Graphs, diagrams. 18 ref.

647* (Theory on Rectification in the Contact Metal-Semiconductor.) **Zur Theorie der Gleichrichtung am Kontakt Metall-Halbleiter.** W. Schultz. *Zeitschrift für Physik*, v. 138, no. 5, 1954, p. 589-612.

Electron and hole flow. Computation of blocking-layer capacitance per unit area as a function of applied bias. Diagram. 19 ref.

648* (Anomalies of Electron Emission of Tungsten Heated by a Pulse of High Current Density.) **Anomalii elektronnoi emissii vol-frama, nagrevaemogo impul'som toka bol'shoi plotnosti.** S. V. Lebedev and S. E. Khaikin. *Zhurnal Eksperi-*

Electronics

mental'noi i Teoreticheskoi Fiziki, v. 26, no. 6, June 1954, p. 723-735.

Thermionic emission of W cathodes. Graphs, diagrams, circuits.

Books and Miscellaneous Publications

649 Information Theory. Stanford Goldman. 385 p. 1954. Prentice-Hall, Inc., New York. (TK5101 G56i)

Information systems; signals; noise; correlation, filtering, and prediction.

650 Television. V. K. Zworykin and G. A. Morton. 2nd Ed. 1037 p. 1954. John Wiley & Sons, Inc., New York. (TK6630 Z99t2)

A detailed account of the entire television system, with special emphasis on the two fundamental elements—the camera tube and the kinescope; also covers the electronics of image transmission in color and monochrome.

651* A Survey of Automatic Digital Computers. Prepared by Office of Naval Research, Department of the Navy. 109 p. 1953. U. S. Department of Commerce, Office of Technical Services, Washington 25, D. C. (TK7872.C5 Un3.5s)

Tabulation of the characteristics of 98 large-scale computers.

652 Automatic Digital Computation. Proceedings of a Symposium, National Physical Laboratory. 296 p. 1954. Her Majesty's Stationery Office, London. (TK7872.C5 G79.5a)

Thirty-eight papers on operation of large and small British computors, programming, design, utilization, circuity, and maintenance.

See also:

107 ($BaTiO_3$ as a ferroelectric substance)
145 (piezoelectric ceramics)
172 (computers in chemical engineering)
475 (failures caused by metal whiskers)
476 (standard for components and insulation)
807 (tuned galvanometer amplifier)
1259 (grenz-ray dosimeter)
1329 (ferrites in electronic circuits)
1333 (properties and uses of ferrites)
1356 (photovoltaic effect in CdS)
1561 (electronics in pulp and paper industry)

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653* Analyses of Factors That Affect Mill Consumption of Cotton in the United States. Frank Lowenstein and Martin S. Simon. *Agricultural Economics Research*, v. 6, Oct. 1954, p. 101-110.

Effects of production and consumer income trends. Graphs, tables.

654 Today's Processes Are Compared. William H. Tonn, Jr. *Chemical Engineering*, v. 61, Nov. 1954, p. 157-160.

Economics of six processes for phenol production. Graph, flowsheets, tables.

655 Sulfuric Acid: The Decade Ahead. Robert Frank. *Chemical Week*, v. 75, Oct. 30, 1954, p. 33-36, 38, 40.

Production and consumption trends and outlook. Graphs, map, table.

656* (Coal Products, Oil and Gas in the U.S.A.) **Kohlenwerstoffe, Öl und Gas in den USA.** H. Nedelmann. *Chemische Industrie*, v. 6, no. 9, Sept. 1954, p. 491-494.

Reflects German viewpoint of American oil industry's post-war expansion and its effect on the world naphthaline and impregnating oil markets. Graph, diagram, tables.

657* (Naval Stores on the World Market.) **Naval Stores auf dem Weltmarkt.** Wilhelm von Haken. *Chemische Industrie*, v. 6, no. 9, Sept. 1954, p. 495-500.

New fields of application are sought. Tables.

658 How We Prepare Preliminary Estimates. William R. Corbett. *Consulting Engineer*, v. 4, Oct. 1954, p. 42-45, 78.

Evaluation of costs in design and construction of manufacturing plants. Flowsheet, tables, diagram.

659* Canada's Competitive Position as a Power Producer. J. A. Fuller. *Edison Electric Institute Bulletin*, v. 22, Sept. 1954, p. 315-319.

Electric power sites; energy resources; tax and other cost factors.

660 Economic Challenge of Longevity. Allen W. Rucker. *Harvard Business Review*, v. 32, Nov.-Dec. 1954, p. 94-102.

Factors in planning for rapid growth in no. of people over 65 yr. Tables, graphs. 5 ref.

661 Program for Product Diversification. Thomas A. Staudt. *Harvard Business Review*, v. 32, Nov.-Dec. 1954, p. 121-131.

Factors of products, management, and planning determine feasibility. Graphs.

662 The Economics of Replacement in the Steel Industry. G. G. Beard. *Iron and Steel Engineer*, v. 31, Oct. 1954, p. 55-65; disc., p. 65-66.

Procedures for determining time to replace equipment. Graphs, tables. 2 ref.

663* Economic Power From Breeder Reactors. C. A. Rennie. *Journal of Nuclear Energy*, v. 1, Aug. 1954, p. 39-46.

Includes tables, graph, diagram.

664 Swiss Non-Ferrous Metal Industry. R. Stadler. *Metal Industry*, v. 85, Sept. 24, 1954, p. 253-254.

Development and present status.

665* Maintenance Programs for Production Efficiency and Cost Controls. Ernest C. Morse. *Modern Industrial Press*, v. 16, Oct. 1954, p. 36, 40, 42, 44.

Includes photographs, sample work cards.

666 Making Analytical Engineering Appraisals. Dean H. Sheldon. *Oil and Gas Journal*, v. 53, Oct. 25, 1954, p. 104-108.

Methods for making an estimate of the quantity of hydrocarbons that may be recovered from an oil or gas reservoir and the profit that may be derived from their sale. Graphs.

667* Battle of Energies. Ernestine Adams. *Petroleum Engineer (Management Edition)*, v. 26, Oct. 1954, p. A83-A86, A88-A91.

Trends and prospects in use of water power, crude oil, coal, natural gas, and at. and solar energy. Graphs.

668* U. S. Bureau of Mines Reports on Iron Ore in 1953. R. W. Holliday. *Skillings' Mining Review*, v. 43, Oct. 16, 1954, p. 1-2, 12-13.

Production and consumption statistics for U. S.. Tables.

669* Economic Review—Pulp, Paper, and Paperboard. W. LeRoy Neubrech. *Southern Pulp and Paper Manufacturer*, v. 17, Oct. 1, 1954, p. 44-46, 48.

New uses for paper; production and demand statistics. Merchandising practices. Pulp and pulpwood supplies. Graphs.

670* (Maintenance Cost of Soaking Pits.) **Tiefofen-Instandhaltungskosten.** Herbert Peters. *Stahl und Eisen*, v. 74, no. 19, Sept. 9, 1954, p. 1212-1215.

Repair costs, possible savings, soaking pit slags, and performance of various types of brick. Diagrams, graphs, tables, photographs. 2 ref.

Books and Miscellaneous Publications

671 Statistical Analysis in Chemistry and the Chemical Industry. Carl A. Bennett and Norman L. Franklin. 724 p. 1954. John Wiley and Sons, Inc., New York. (QA276 B43s)

Text is intermediate between mathematical statistics and examples of applications only. The first chapters cover fundamentals; later chapters describe special applications.

672 Big Enterprise in a Competitive System. A. D. H. Kaplan. 269 p. 1954. The Brookings Institution, Washington, D. C. (HD2731 K14b)

Examination of the structure and performance of big business in relation to the objectives that the economy is expected to serve.

673 Demands for Energy. Richard J. Lund. Paper from CENTENNIAL OF ENGINEERING, 1852-1952. History and Proceedings of Symposia. p. 834-863. 1953. Museum of Science and Industry, Chicago. (T23 C33)

Trends in over-all use and use patterns by type of fuel; losses and wastes; geographical features of energy demands; future demands. Graphs, tables, diagram, map. 19 ref.

674 Industry and Science. Manchester Joint Research Council. 188 p. 1954. Manchester University Press, Manchester, England. (T175 M31i)

Results of comprehensive, confidential survey of selected private industries in this vicinity on their use of available technology facilities.

See also:
888 (economics of electrometallurgy in India)
913 (machining costs)
1012 (heat-treating costs)
1215 (costs in powder metallurgy)
1318 (economics of ore beneficiation)
1446 (prediction of air-conditioning demands)
1565 (market survey for pulp products)
1567 (pulp mill costs)

FLUID MECHANICS

675 An Experimental Study of Acoustically Induced Cavitation in Liquids. William J. Galloway. *Acoustical Society of America, Journal*, v. 26, Sept. 1954, p. 849-857.

Measured factors of air content, hydrostatic pressure, temperature, and surface tension. Photographs, diagrams, graphs, table. 15 ref.

676 Generalized *pvT* Properties of Gases. L. C. Nelson and E. F. Obert. *ASME, Transactions*, v. 76, Oct. 1954, p. 1057-1066.

Two sets of generalized compressibility charts based upon critical temperatures and pressures, and upon pseudo-reduced co-ordinates obtainable from the Lennard-Jones force potential. Graphs, tables. 313 ref.

677 Survey of Experimental Determinations of Heat Capacity of Ten Technically Important Gases. Joseph F. Masi. *ASME, Transactions*, v. 76, Oct. 1954, p. 1067-1074.

Review of heat capacity measurements of air, NH_3, CO_2, CO, H_2, CH_4, NO, N_2, O_2 and H_2O by direct and indirect methods, covering period from 1925-1952. Graphs, tables, diagram. 53 ref.

678* (Kinematic Structure of Collapse Cavitation of a Circular Profile.) **Kinematicheskaia struktura sryvnoi kavitatsii kruglovo profilia.** K. K. Shal'nev. *Doklady Akademii Nauk SSSR*, v. 97, no. 5, Aug. 11, 1954, p. 785-788.

Includes table, graphs, micrographs. 16 ref.

679 A Proposal for Fundamental Equations of Dynamics of Gases Under High Stress. (A Proposal for Statistical Mechanical Treatment of Systems Not in Thermal Equilibrium Associated With Transport Phenomena.) Toyoki Koga. *Journal of Chemical Physics*, v. 22, Oct. 1954, p. 1633-1646.

Includes diagrams. 12 ref.

680* (On an Expansion of the Helmholtz Principle.) **Über eine Erweiterung des Helmholtzschen Prinzips.** J. Pawlowski. *Kolloid-Zeitschrift*, v. 138, no. 1, Aug. 1954, p. 6-11.

Application to flow of non-elastic non-Newtonian liquids whose tensor of deformation rate and stress deviator are coaxial and identical. Correlation with earlier phenomenological research. 8 ref.

681* (Equalizing Processes in the Maxwell Liquid.) **Über Ausgleichsvorgänge in der Maxwell-Flüssigkeit.** J. Pawlowski. *Kolloid-Zeitschrift*, v. 138, no. 1, Aug. 1954, p. 20-28.

Flow of liquid between two unlimited parallel planes. Resilience of the stress-relieved substance. Relaxation time of an elastic-viscous substance. Graphs, diagrams. 3 ref.

682* (Theoretical and Experimental Investigations on the Place-Exchange Theory of Viscous Flow.) **Theoretische und experimentelle Untersuchungen zur Platzwechseltheorie des viskosen Fliessens.** Helmut Weymann. *Kolloid-Zeitschrift*, v. 138, no. 1, Aug. 1954, p. 41-56.

Derivation of formula for highly viscous flow by a purely mechanico-statistical method. Testing of the developed theory on polystyrene and acronal. Diagrams, graphs. 7 ref.

683 Effects of Underwater Explosions of Elastic Structures in Water. Erik Enhamre. *Kungl. Tekniska Högskolans Handlingar (Transactions of the Royal Institute of Technology, Stockholm, Sweden)*, 1954, no. 82, 78 p. (T4 A96t)

Findings from a defense study prompted by bombing of the Möhne and Eder Dams in World War II. Photographs, diagrams, graphs, tables. 30 ref.

684* Hydraulics for Pipeliners. V. Accuracy and the f-Factor. C. B. Lester. *Pipe Line News*, v. 26, Oct. 1954, p. 65-72.

Basic considerations leading up to a recommendation of accuracy and methods to be used for the computation of friction loss in pipeline flow. Graphs.

685* A Photographic Investigation Into the Disintegration of Liquid Sheets. N. Dombrowski and R. P. Fraser. *Royal Society of London, Philosophical Transactions*, v. 247, ser. A, no. 924, Sept. 20, 1954, p. 101-130 + 12 plates.

Methods of producing sheets are classified; effects of physical conditions and properties are studied. Diagrams, graphs, photographs, tables. 20 ref.

686 Convection of a Pattern of Vorticity Through a Shock Wave. H. S. Ribner. *U. S. National Advisory Committee for Aeronautics, Report* 1164, 1954, 17 p. (TL521 Un3r)

Studies of the passage of a single representative weak shear wave through a plane shock shows refraction and modification of the shear wave with simultaneous generation of an acoustically intense sound wave. Tables, diagrams, graphs. 10 ref.

687 The Hydrodynamic Characteristics of an Aspect-Ratio-0.125 Modified Rectangular Flat Plate Operating Near a Free Water Surface. John A. Ramsen and Victor L. Vaughan, Jr. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3249, Oct. 1954, 32 p. (TL570 Un3t)

Hydrodynamic force characteristics of plate mounted on a single strut and operating at several depths of submersion. Diagrams, graphs. 7 ref.

See also:
323 (properties of imperfect gases)
796 (measuring air flow)

FOOD TECHNOLOGY

688 Radiation in Food Processing. B. S. Schweigert. *American Dietetic Association, Journal*, v. 30, Oct. 1954, p. 973-975.

Sterilization processes; off flavors and other problems. Table.

689 Chemical Engineering Methods in the Food Industry. Developments in Handling and Storage of Flour. J. F. Lockwood and C. H. Wooll. *Chemistry & Industry*, 1954, no. 37, Sept. 11, p. 1128-1134.

Change from mechanical to pneumatic conveying; bulk storage and transport. Photographs, diagrams.

690* (Antifermentatives.) **Gli antifermentativi.** Giorgio Lantini. *Illustrazione Scientifica*, v. 6, no. 58, Sept. 1954, p. 26-28.

Tests of various chemicals as food preservatives. Photographs.

691 Does Irradiation Induce Radioactivity in Food? W. Wayne Meinke. *Nucleonics*, v. 12, Oct. 1954, p. 37-39.

Negative results obtained with irradiated samples of 24 elements that occur in food indicate that induced radioactivity is no problem in food sterilization. Tables. 18 ref.

692* Unicellular Algae as a Source of Food. M. J. Geoghegan. *World Crops*, v. 6, Oct. 1954, p. 413-416.

Culture techniques; nutritive value. Photograph, micrograph, diagram. 16 ref.

Food Technology

Books and Miscellaneous Publications

693 The Chemistry and Technology of Fruit and Vegetable Juice Production. Donald K. Tressler and Maynard A. Joslyn. 962 p. 1954. AVI Publishing Company, Inc., New York. (TP562 T72c)

History; economic aspects; preparation; canning; dehydration. Jelly making. Nutritive values.

694 Food. From REPORTS ON THE PROGRESS OF APPLIED CHEMISTRY. p. 748-784. 1953. Society of Chemical Industry, London. (TP1 So13r)

Five papers on world developments in processing fish, meat, cereals, dairy products, and candy. 456 ref.

See also:
54 (storage of potatoes)

FUELS AND COMBUSTION

695 Pyramid Grates. Deep Firing of Anthracite in Low Pressure Heating Boilers. Henry K. Eilers. *Anthracite Conference, Transactions, Lehigh University, Eleventh,* 1953, p. 11-20. (TN820 An86t)

Description of the grates and control systems used in commercial hand-fired installations. Tables, diagrams, photograph.

696 Stoker Design—A Challenge to the Coal Industry. L. C. Dubs. *Anthracite Conference, Transactions, Lehigh University, Eleventh,* 1953, p. 21-36. (TN820 An86t)

Description of the Dump Grate anthracite stokers and their application to commercial applications. Photographs, diagrams, table.

697 High-Btu Gas From Anthracite. L. L. Newman. *Anthracite Conference, Transactions, Lehigh University, Eleventh,* 1953, p. 101-116. (TN820 An86t)

Report on the economics and method of production. Tables. 19 ref.

698 The Blending of Anthrafines in Coke Production: 1948-1952. J. D. Clendenin and Joseph Kohlberg. *Anthracite Conference, Transactions, Lehigh University, Eleventh,* 1953, p. 127-155. (TN820 An86t)

Methods for increasing coke quality; the extent, costs, and comparative value of such blending; effects on breeze production and on coking pressure; results of process in actual practice. Tables, graphs. 26 ref.

699 Combustion Through Ash Barriers. H. T. Grendon and C. C. Wright. *Anthracite Conference, Transactions, Lehigh University, Eleventh,* 1953, p. 219-242. (TN820 An 86t)

Basic study of the effect of ash on the burning characteristics of anthracite. Graphs, diagrams, photographs, micrograph. 6 ref.

700* (Our Present-Day Physical and Chemical "Picture" of Coal.) **Unser derzeitiges physikalisches und chemische Bild der Kohle.** D. W. van Krevelen. *Brennstoff-Chemie,* v. 35, nos. 17-18, Sept. 15, 1954, p. 257-262.

Review of literature on capillary, X-ray, mechanical and colloid-chemical investigations of coal as a means of determining its microstructure and explaining its properties. Diagrams, photographs, graphs. 37 ref. (To be continued.)

701* (On the Plastic Behavior of Coal.) **Uber das plastische Verhalten von Steinkohlen.** H. Hoffman and K. Hoehne. *Brennstoff-Chemie,* v. 35, nos. 17-18, Sept. 15, 1954, p. 269-275.

Study of the plastic properties of different coals in relation to their ash and volatile-matter contents. Graphs, tables.

702 Isotope Effects in the Combustion of Carbon Monoxide. R. W. Attree, F. Brown, G. E. Dunn, and M. Lounsbury. *Canadian Journal of Chemistry,* v. 32, Oct. 1954, p. 921-930.

Reaction rates of $C^{12}O$, $C^{13}O$, and $C^{14}O$ and O_2 are measured. No isotope effect was present in gas phase reactions. Diagram, tables. 8 ref.

703* (Fuels and Their Combustion.) **Les combustibles et leur combustion. VII.** (Apparatus for Analyzing Smoke.) **Des appareils utilisés pour l'analyse des fumées.** Roger Martin. *Chaleur & Industrie,* v. 35, no. 350, Sept. 1954, p. 257-269.

Description of gas-analysis equipment and methods. Diagrams, photographs, tables.

704 Try This Feeder for Coal Gasification. Walter Coopey. *Chemical Engineering,* v. 61, Nov. 1954, p. 162-163.

Designed for partial combustion under pressure. Diagram.

705 Producer Gas. G. M. Horner. *Chemistry in Canada,* v. 6, Oct. 1954, p. 28-32.

Review of the process, advantages, applications, and the highly developed equipment now available. Diagrams, tables, photograph.

706* Cool Flame Phenomena in the Oxidation of Ethane. J. H. Knox and R. G. W. Norrish. *Faraday Society, Transactions,* v. 50, Sept. 1954, p. 928-933.

Studied from 300 to 380 C, down to 600 mm. Hg with ethane: O_2 ratios from 32:1 to 3:2. Graphs. 10 ref.

707* The Unsteady Burning of Cordite. J. D. Huffington. *Faraday Society, Transactions,* v. 50, Sept. 1954, p. 942-952 + 1 plate.

Phenomena known as chuffing and as oscillatory burning at slightly higher pressure are studied. Diagrams, photographs, graphs. 7 ref.

708 X-Ray Studies of the Ultra-Fine Structure of Coal. II. Atomic Distribution Functions of Vitrinite From Bituminous Coals. J. B. Nelson. *Fuel,* v. 33, Oct. 1954, p. 381-393.

Includes graphs, tables, diagram. 26 ref.

709 Measurement of the Burning Velocities of Hydrocarbon-Air Mixtures Using a Nozzle Burner. F. H. Garner, R. Long, and B. Thorley. *Fuel,* v. 33, Oct. 1954, p. 394-405.

Luminous, shadow, and schlieren images of the flame cones have been measured in benzene-, propane-, and ethylene-air mixtures. Graphs, tables, photograph. 18 ref.

710 Studies in Bomb Calorimetry I. Determination of the Calorific Value of Solid Fuels. R. A. Mott and W. C. Thomas. **II. Determination of the Calorific Value of Liquid Fuels.** J. E. Barker and R. A. Mott. *Fuel,* v. 33, Oct. 1954, p. 448-479.

Ignition, physical state of the fuel, choice of crucible, and O requirements for complete combustion. Tables, graphs, diagrams. 36 ref.

711 A Study of Coal Extracts by Infra-Red Spectroscopy. W. A. Kirkby, J. R. A. Lakey, and R. J. Sarjant. *Fuel,* v. 33, Oct. 1954, p. 480-496.

Chemical constitution of a wide range of coals including both coking and non-coking coals. Tables, graphs, circuit, diagrams. 14 ref.

712* Gas Manufacture by the Tully Complete Gasification Process. J. E. Tully. *Gas Journal,* v. 279, Sept. 29, 1954, p. 782-787.

Equipment and operating procedures. Diagrams, tables, graphs.

713 Fuels and Chemicals From Coal Hydrogenation. E. E. Donath. *Industrial and Engineering Chemistry,* v. 46, Oct. 1954, p. 2032-2035.

Rehydrogenation of higher boiling tar acids proposed to increase phenol production; economically favorable product distribution balances increased processing costs. Tables, graphs, diagram. 5 ref.

714 Stability of Aircraft Turbine Fuels. C. R. Johnson, D. F. Fink, and A. C. Nixon. *Industrial and Engineering Chemistry,* v. 46, Oct. 1954, p. 2166-2173.

Problems encountered in engine performance and low-temperature filtration of fuels when stored for great lengths of time under a variety of climatic conditions. Graphs, tables, micrographs. 16 ref.

715 Minimum Spontaneous Ignition Temperatures of Combustibles in Air. M. G. Zabetakis, A. L. Furno, and G. W. Jones. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2173-2178.

New apparatus developed which makes the determination of autogenous ignition temperature more rapid, accurate, and economical. Graphs, tables, photograph, diagram. 11 ref.

716 Measuring Burning Quality of Distillate Fuels. G. I. Worrall. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2178-2182.

Side and bottom C deposits in a vaporizing pot burner serve as a key to burning quality of domestic oil burners. Graphs, tables, diagrams, photograph. 10 ref.

717 Atomization of Liquid Fuels by High Pressure Natural Gas. George Grosvenor. *Iron and Steel Engineer*, v. 31, Oct. 1954, p. 77-80.

Increased production gained by open-hearth burners. Diagrams, photographs.

718* The Distributions of Concentration and Temperature in a Laminar Jet Diffusion Flame. James A. Fay. *Journal of the Aeronautical Sciences*, v. 21, Oct. 1954, p. 681-689.

Linear relation of distribution of velocity, temperature, and concentration; velocity field determines temperature and concentration; flame length calculated. Graphs. 11 ref.

719* (Flame Radiation Power in Industrial Furnaces.) **Il potere radiante delle flamme nei forni industriali.** Francesco Savioli. *Metallurgia italian*, v. 46, nos. 7-8, July-Aug. 1954; *Atti notizie (AIM)*, v. 9, nos. 7-8, July-Aug. 1954, p. 215-225.

Thermokinetics and combustion mechanisms. Possible applications to open-hearth furnaces. Diagrams, charts, table. 122 ref.

720* Liquid Coal for a Solid Future. M. Lelyn Branin. *Midwest Engineer*, v. 7, Oct. 1954, p. 7 + 4 pages.

Summary of work being done in development of liquid fuels and chemicals from coal and prediction of future trends.

721* Rapid Analysis for the Inorganic Constituents of Coal Ash. (Japanese.) Yoshimi Umezaki. *Resources Research Institute, Reports (Japan)*, no. 15, Oct. 1954, 18 p.

Presents analysis for SiO_2, Al_2O_3, Fe oxides, CaO, Na_2O, and K_2O. Tables, graphs. 20 ref.

722 The Effect of Drop Size on Flame Propagation in Liquid Aerosols. J. H. Burgoyne and L. Cohen. *Royal Society, Proceedings*, v. 225, ser. A, Sept. 14, 1954, p. 375-392 + 2 plates.

Suspensions of controlled uniform drop size was prepared from pure liquids to study combustion properties of a liquid-in-air suspension. Diagrams, tables, graphs, photographs. 13 ref.

723* (Revolving-Grate Gas Generator.) **Drehrost Gaserzeuger.** *Sprechsaal*, v. 87, no. 17, Sept. 5, 1954, p. 429-430.

Construction and operation of series of gas producers with revolving grates. Compares the advantages and disadvantages to different types. Diagrams, photograph.

724* (Rotating-Grate Gas Producer.) **Drehrost-Gaserzeuger.** *Sprechsaal*, v. 87, no. 18, Sept. 20, 1954, p. 453-456.

Describes features of four different designs of rotating-grate generators. Diagrams.

725* On the Combustion Rate of a Group of Fuel Particles Injected Through a Swirl Nozzle. (English.) Yasui Tanasawa. *Technology Reports, Tôhoku University*, v. 18, 1954, p. 195-208.

Determination of combustion duration of fuel particles, using a graphical method. Graphs, diagrams, tables, micrographs. 4 ref.

726* An Experimental Study on the Combustion of a Single Fuel Droplet. (English.) Kiyosi Kobayasi. *Technology Reports, Tôhoku University*, v. 18, 1954, p. 223-234.

Studies of a single fuel droplet suspended by a quartz fiber. Photographs, graphs, diagram, tables. 10 ref.

727* (The Burning of the Correct Fuel in the Proper Heating Appliance.) **Jets over het stoken van de juiste brandstof in het daarvoor geschikte stooktoestel.** F. van Beek and A. J. J. Berkhout. *T.N.O. Nieuws*, v. 9, no. 102, Sept. 1954, p. 318-320.

Description of heating installations. Results of heating tests with various fuels. Diagram, graphs.

728* (Gasification of Fine Peat of Cylindrical Form.) **Gazifikatsiia melkokuskovogo torfa tsilindricheskoi formy.** A. P. Kotkovskii, K. A. Mil'kamanovich, A. S. Sasim, S. S. Mal'- and M. V. Kadach. *Torfianaia Promyshlennost'*, v. 31, no. 6, 1954, p. 21-23.

Use in industrial gas generators. Three techniques of operation, with engineering instructions. Tables.

729* Washington Coal Gasification Studies. George A. Kennar and R. W. Moulton. *Trend in Engineering, (University of Washington)*, v. 6, Oct. 1954, p. 9-15, 28.

Review of work on theory, methods, and equipment. Diagrams, tables, photograph. 24 ref.

730* (Oxidation of Kerosene by Atmospheric Oxygen in the Presence of Chlorine.) **Okislenie kerosina kislorodom vozdukha v prisutstvii khlora.** M. S. Malinovskii, N. I. Zemlianskii, and L. K. Klimovskaia. *Zhurnal Prikladnoi Khimii*, v. 27, no. 9, Sept. 1954, p. 1028-1032.

Temperatures at which chlorine initiates oxidation. Comparing effects of chlorine with that of metallic catalysts. Spectrographic data. Tables. graphs. 7 ref.

Books and Miscellaneous Publications

731 Fuel and Fuel Products. From REPORTS ON THE PROCESS OF APPLIED CHEMISTRY. p. 6-74. 1953. Society of Chemical Industry, London. (TP1 So13r)

Four papers on developments in Great Britain in fuels, gas production, destructive distillation, tar and tar products, and petroleum. 505 ref.

See also:
184 (gas purification)
667 (competition of fuels)
977 (fuel for metallurgical furnaces)
1141 (fuels for metallurgical furnaces)

GEOLOGY AND MINERALOGY

732* (Contemporary Problems of Radiogeology.) **Sovremennye problemy radiogeologii.** G. V. Voitkevich. *Izvestiia Akademii Nauk SSSR, Seriia Geologicheskaia*, 1954, no. 5, Sept.-Oct., p. 3-20.

Isotopes and radioactive decay; new light on growth of elements; nature of most ancient sections of earth's crust, and chronology. Tables. 60 ref.

733* Geochemistry. Another Tool in the Search for Ore. Stephen H. Congdon. *Skillings' Mining Review*, v. 43, Oct. 2, 1954, p. 1-2, 4, 8.

Geochemical prospecting methods. Colorimetry. Biogeochemistry. Diagram. 12 ref.

734* (Basic Remarks on Clay Rocks and Their Deposits.) **Grundsätzliche Bemerkungen über Tongesteine und ihre Lagerstäten. III.** (On the Formation of Clay-Mineral Deposits as a Basis for Ceramic Raw Materials.) **Uber die Entstehung von Tonlagerstätten als Basis keramischer Rohstoffe.** Hans Vetter. *Sprechsaal*, v. 87, no. 17, Sept. 5, 1954, p. 425-427.

Shows that types of rock depend largely on the history of the earth and changes of its surface; also that porosity, water absorptivity, and soluble-salt contents are important in the industrial utility of rocks. Diagrams, tables. 4 ref.

Books and Miscellaneous Publications

735 Geochemistry. V. M. Goldschmidt. International Series of Monographs on Physics. 730 p. 1954. Oxford University Press, London. (QE515 G57g)

A wide survey with applications to pedology and plant nutrition; abundance and occurrence of individual chemical elements.

Geology and Mineralogy

736 Rocks and Mineral Deposits. Paul Niggli. 559 p. 1954. W. H. Freeman and Company, San Francisco. (QE363 N56gtr) (Translated from the German by Robert L. Parker.)

Previously abstracted from original. See item 5811, v. 2, July 1953.

See also:
1264 (radioactivity of rocks)

GEOPHYSICS

737 Radio Astronomy. J. A. Roberts. *Research*, v, 7, Oct. 1954, p. 388-399.

Review. Diagrams, photographs, tables, graphs. 43 ref.

738* More About the Jet Stream. Bernard C. Frost. *Shell Aviation News*, 1954, no. 195, Sept., 14-18.

Cloud effects, properties, and mechanism of jet stream winds. Photographs.

739* (Basic Problems of Marine and Oceanic Microbiology.) **Osnovnye zadachi morskoi i okeanicheskoi mikrobiologii.** A. E. Kriss. *Vestnik Akademii Nauk SSSR*, v. 24, no. 8, Aug. 1954, p. 22-34.

Quantitative distribution of bacteria at different depths in oceans. Relation to growth of plants and animals. Graphs, table, map.

740* (Methods and Results of Radio Astronomy.) **Methoden und Ergebnisse der Radioastronomie. I.** Heinrich Siedentopf. *Zeitschrift für angewandte Physik*, v. 6, no. 8, Aug. 1954, p. 376-384.

Limitations of devices used in radio astronomy; discussion on thermal emission from solar corona, variable radio emission from disturbed areas on the sun, and extragalactic sources. Photograph, diagrams, graphs. 48 ref. (To be concluded.)

Books and Miscellaneous Publications

741 Conference on Radio Meteorology, Proceedings. Articles individually paged. The Bureau of Engineering Research, University of Texas, Austin. (QC861 C76p)

Summaries and abstracts of 48 papers on tropospheric propagation, refractive index meteorology, scattering and turbulence, thunderstorm and tornado atmospherics, cloud and precipitation physics, and operational use of weather radar.

742 Conference on Radio Meteorology, Supplement to the Proceedings. Articles individually paged. The Bureau of Engineering Research, University of Texas, Austin. (QC861 C76p)

Discussions of papers covered in the *Proceedings* and 17 additional papers covering tropospheric propagation, refractivity gradient, atmospheric turbulence, thunderstorms, lightning, cloud physics, and weather forecasting.

See also:
488 (electrical prospecting)

GRAPHIC ARTS

743* Rotogravure Printing. Roll-Fed Press Operations. Joseph R. Caulfield. *American Pressman*, v. 64, Oct. 1954, p. 29-32.

Includes photographs, diagram.

744* (Determination of the Spectral Sensitivity of Blueprint Paper.) **Bestimmung der spektralen Empfindlichkeit von Lichtpauspapier.** Konrad Hoffmann and Lotte Fischer. *Angewandte Chemie*, v. 66, no. 19, Oct. 7, 1954, p. 593-595.

Ozalid contrast and Blue F Rapid papers are studied. Diagram, graphs. 5 ref.

745* What Pressmen Should Know About Carton Printing. XXVI. What to Look for While the Job Is Running. *Boxboard Containers*, v. 72, Nov. 1954, p. 33, 36-38.

Color and adjustment problems. Detection of smashes. Photographs. (To be continued.)

746 The Preparation of Ultra-Fine Grain Photographic Emulsions. B. H. Crawford. *Journal of Scientific Instruments*, v. 31, Sept. 1954, p. 333-335.

Includes tables, graph, diagrams. 3 ref.

747* Photo-Composing. VII. Troubles and Remedies. Charles W. Latham. *Modern Lithography*, v. 22, Oct. 1954, p. 52-53.

Includes diagram.

748* Measuring Ink on Press Rollers. Paul C. Aebersold and Charles E. Crompton. *Modern Lithography*, v. 22, Oct. 1954, p. 57, 60.

Use of radioactive gaging method. Table, graph.

749* Photography in Oil Research. I. A. J. Insall and J. W. Drinkwater. *Petroleum*, v. 17, Oct. 1954, p. 350-354, 382.

Use of photography in measurement of interfacial tension, air flow in gas turbine combustion chambers, atomization of liquid fuels, engine indicating, and burning velocities of hydrocarbons. Photographs, graphs, spectra.

750* A Compact 70 mm Camera for Jet Aircraft. John A. Maurer and Joseph F. G. Milner. *Photographic Engineering*, v. 5, no. 2, 1954, p. 73-79.

Description, operations, versatility, and application of the P-2 camera. Photographs, diagrams, circuit.

751* A 0.1 Microsecond Kerr-Cell Shutter. Morton Sultanoff. *Photographic Engineering*, v. 5, no. 2, 1954, p. 80-90.

Theory and method of operation; performance characteristics; explosive studies; film and development. Photographs, circuit, diagrams, oscillograms. 25 ref.

752* High Speed Print-Out Emulsions. H. T. Dybvig and T. R. Thompson. *Photographic Engineering*, v. 5, no. 2, 1954, p. 127-132.

Study of the properties of print-out emulsions leading to high-speed print-out material with sufficient sensitivity for detecting γ-ray exposures in the range harmful to man. Tables, graphs. 4 ref.

See also:
127 (silk-screen printing of gold on glass)
445 (motion pictures in corrosion research)
609 (photographic flash tubes)
824 (lubrication of printing machinery)

HEAT POWER

753 Ultrasonic Temperature Measurement in Internal Combustion Engine Chamber. J. C. Livengood, T. P. Rona, and J. J. Baruch. *Acoustical Society of America, Journal*, v. 26, Sept. 1954, p. 824-830.

Method and apparatus for measuring sound velocity in ignited gases. Diagrams, photographs, table, graph. 16 ref.

754 Trends in Aircraft Equipment. Julius Kendall. *Aero Digest*, v. 69, Oct. 1954, p. 53-56, 58.

Testing techniques for gas turbine engines. Photographs, graphs.

755* Thrust Augmentation. G. C. R. Mathieson. *Aeroplane*, v. 87, Oct. 1, 1954, p. 516-520.

Methods of supplementing the thrust of jet engines. Tables, diagrams, graphs.

756 The Mechanism of Carbon Formation. George Porter. *AGARD Memorandum*, no. AG13/M9, 16 p. (TL565 Ag11)

Theory and experimental data relating to C formation obtained by flash photolysis technique. Graphs, table, diagram. 26 ref.

757* (The Elasticity of the High-Pressure Steam Turbine in Operation.) **Die Elastizität der Hochdruck-Dampfturbine im Betrieb.** Karl Röder. *Allgemeine Wärmetechnik; Zeitschrift für wärme- und Kältetechnik*, v. 5, nos. 5-6, 1954, p. 116-119.

Redesign of turbines with radial seals to provide for expanding-contracting effect of heating and cooling. Diagrams.

758* (Measuring the Combustion Temperature in Engines.) **Messung der Verbrennungstemperatur in Motoren.** R.

Gauger. *Archiv für technisches Messen*, 1954, no. 224, Sept., p. 201-204.

Spectral-line reversal, electro-optical pyrometer, and other well-known methods of measuring temperature are discussed. Photographs, diagrams. 18 ref.

759* The Development of the Axial Flow Compressor for the Orenda Engine. F. H. Keast. *Engineering Journal*, v. 37, Sept. 1954, p. 1082-1091.

Cascade testing; stage characteristics; mass flow. Graphs, photograph. 8 ref.

760 Effect of Molecular Structure on Combustion Behavior. Louis C. Gibbons, Henry C. Barnett, and Melvin Gerstein. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2150-2159.

Qualtitative relationships between fundamental combustion properties and performance in a gas turbine combustor for five hydrocarbons. Graphs, tables. 37 ref.

761 Aircraft Turbine Fuel Properties Affecting Combustor Carbon. D. P. Barnard and Lamont Eltinge. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2160-2163.

Investigations of fuel quality to prevent and eliminate C deposits. Diagrams, graphs. 11 ref.

762 Corrosion and Deposit in Gas Turbines. B. O. Buckland. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2163-2166.

Methods developed for inhibiting the corrosive effects of Na and V in ash constituents and the problems involved in using residual fuels. Graphs, table, diagram. 3 ref.

763* The Effect of End Refractory Surfaces Upon the Radiant Heat Absorption Rate of Banks of Water-Cooled Tubes. G. S. Cantle and M. N. El Din. *Institute of Fuel, Journal*, v. 27, Sept. 1954, p. 438-445 + 2 plates.

Includes diagrams, graphs, photographs, tables. 7 ref.

764* Progress Review. XXXII. Steam Generation for Electricity Supply. W. Dixon. *Institute of Fuel, Journal*, v. 27, Sept. 1954, p. 465-476.

Furnaces; boilers; instruments and controls; auxiliary equipment. Tables, diagrams. 13 ref.

765* An Experimental Investigation Into the Effect of Fuel Addition to Intake Air on the Performance of a Compression-Ignition Engine. W. T. Lyn. *Institution of Mechanical Engineers, Proceedings*, v. 168, no. 9, 1954, p. 265-279; disc., p. 287-297.

Includes diagrams, graphs, tables. 12 ref.

766* The Effect of Auxiliary Fuels on the Smoke-Limited Power Output of Diesel Engines. L. D. Derry, E. M. Dodds, E. B. Evans, and D. Royle. *Institute of Mechanical Engineers, Proceedings*, v. 168, no. 9, 1954, p. 280-286; disc., p. 287-297.

Maximum smoke-limited power is obtained with the higher octane number fuels, while with fuels of low octane number, power increase may be limited by occurrence of knocking when the air-fuel ratio is too low. Graphs, tables, diagrams, photograph. 4 ref.

767* Turbocharging Two Stroke Gas Engines. Carlton A. Chamberlain and George H. Bollman. *Pipe Line News*, v. 26, Oct. 1954, p. 37-42.

Presents details of a new type of turbosupercharged two-cycle gas engine. Diagrams, graphs, photographs.

768 Supercharging for Increased Performance in Automotive Power Plants. Walter K. Deacon. *Product Engineering*, v. 25, Oct. 1954, p. 129-137.

Types, operating characteristics, advantages, and limitations of superchargers; effect on power, torque, velocity, acceleration, and fuel consumption; design requirements. Graphs, diagrams, photograph, tables.

769* Researchers Marshal Combustion Study Weapons to Arrest Power-Robbing Preignition. *SAE Journal*, v. 62, Oct. 1954, p. 17-22.

Research contributions from petroleum and automotive industries. Diagrams, oscillograms.

770* The Evolution of the Turbo Compound. F. J. Wiegand and W. R. Eichberg. *SAE Journal*, v. 62, Oct. 1954, p. 23-25.

Developments of the turbo compound cylinder, exhaust valve guide, cooling system, damping system, and fluid coupling. Photographs, diagrams.

771* The Napier Nomad. Herbert Sammons and Ernest Chatterton. *SAE Journal*, v. 62, Oct. 1954, p. 62-65.

British firm has compounded a diesel engine with an axial-flow compressor and a turbine to produce an aircraft powerplant economical to operate. Diagrams, graph, photograph.

772 Vaporization Rates and Drag Coefficients for Isooctane Sprays in Turbulent Air Streams. Robert D. Ingebo. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3265, Oct. 1954, 39 p. (TL570 Un3t)

A droplet camera was used to obtain drop-size distribution and drop-velocity data. Graphs, diagrams, micrograph, tables. 14 ref.

Books and Miscellaneous Publications

773* Bibliography of Books and Published Reports on Gas Turbines, Jet Propulsion, and Rocket Power Plants. January 1950 Through December 1953. Ernest F. Fiock and Carl Halpern. Supplement to NBS Circular 509. 110 p. 1954. National Bureau of Standards, Washington. (ZTL701 F51b)

Comprehensive biblography arranged chronologically under the various subdivisions.

See also:
714 (stability of aircraft turbine fuels)
843 (lubricants for gas turbines)
870 (fuel consumption of automotive vehicles)

INFORMATION—PREPARATION AND DISSEMINATION

774* Documentation in Instrumentation. William A. Wildhack, Joshua Stern, and Julian Smith. *American Documentation*, v. 5, Oct. 1954, p. 223-237.

Organization of instrumentation literature at the National Bureau of Standards. Photographs, table.

775* Machine Literature Searching. VI. Class Definition and Code Construction. J. W Perry, M. M. Berry, and Allen Kent. *American Documentation*, v. 5, Oct. 1954, p. 238-244.

Analysis of discrimination criteria for machine searching.

776 Sources of Information for the Agricultural and Food Chemist. A. W. Marsden. *Chemistry & Industry*, 1954, no. 37, Sept. 11, p. 1138-1141.

Tabulates sources in the United Kingdom and suggests pattern for foreign contacts. 7 ref.

777* Person-to-Person Communications. Dewitt Pike. Edison Electric Institute Bulletin, v. 22, Sept. 1954, p. 311-313.

Barriers to upward and downward movement of information in an organization. Training programs for supervisory personnel. Diagrams.

778 How to Prepare Technical Reports. H. A. Campbell. *Product Engineering*, v. 25, Oct. 1954, p. 154-157.

Guide to selection of appropriate format and mechanical make-up with an analytical approach to the preparation and writing of reports based on classification, subject matter, and audience. Tables.

779* (An Electronic Computing Machine Translates Russian into English.) **Ein elektronische Rechenmaschine übersetzt Russisch in Englisch.** H. Billing. *Umschau in Wissenschaft und Technik*, v. 54, no. 20, Oct. 15, 1954, p. 613.

Brief explanation of present status of electronic language translation. Photograph.

Books and Miscellaneous Publications

780 Handbook of Graphic Presentation. Calvin F. Schmid. 316 p. 1954. The Ronald Press Company, New York. (QA90 Sch52h)

Theory, procedure, and practice of the clear presentation and interpretation of statistical data by means of charts and graphs.

Information—Preparation and Dissemination

See also:
171 (punched cards for chemical process control)
649 (information theory)

INSTRUMENTATION AND LABORATORY APPARATUS

781* (Measuring Temperature in Industry.) **Temperaturmessung in der Industrie.** H. Frisch. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben*, v. 99, nos. 8-9, Aug.-Sept. 1954, p. 172-176.

Vapor-pressure, liquid-expansion, resistance, thermoelectrical, and radiation thermometers are described and illustrated. Diagrams, photograph. 5 ref.

782 Operating Data for the Murex Hot-Crack Testing Machine. E. C. Rollason and D.F.T. Roberts. *British Welding Journal*, v. 1, Oct. 1954, p. 441-447.

Practical significance of test data for mild and stainless steel electrode deposits. Photographs, diagrams, tables, graphs. 4 ref.

783 New Weapon for Liquid No Man's Land. *Chemical Week*, v. 75, Oct. 30, 1954, p. 72, 74, 76, 78.

Practical viscometer for the rapid, reliable determination of the viscosity of thixotropic fluids. Photographs, diagram.

784 The Dampometer. Carl Olof Olsson and Kazimierz Orlik-Rückemann. *Electronic Engineering*, v. 26, Oct. 1954, p. 420-428.

Description of electronic apparatus for automatic recording of the logarithmic decrement and frequency of oscillations in the audio and sub-audio frequency range. Diagrams, photographs.

785 A Differential Leak Detector for Evacuated Vessels. D. A. Lunderg. *Electronic Engineering*, v. 26, Oct. 1954, p. 436-440.

Apparatus uses two Klemperer-type cold-cathode ionization gauges in a bridge circuit, the balance of which is disturbed when a jet of calor gas is passed over a leak. Diagrams, table, photograph, circuits.

786* (Pressure Filtering With Centrifuges.) **Zentrifugenfiltration mit hohen Drucken.** W. Keup. *Experientia*, v. 10, no. 9, Sept. 1954, p. 389-391.

Filter apparatus for high pressure filtration and its use in normal centrifuges is described. Photographs. 21 ref.

787* Some Swedish Contributions to the Development of Instruments for Macromolecular Research. (English.) Stig Claesson.. *IVA Tidskrift for Teknisk-Vetenskaplig Forskning*, v. 25, no. 5, 1954, p. 186-193.

Ultracentrifuges, osmotic pressure apparatus, viscometry, electrophoresis, and chromatography. Graph, photographs. 7 ref.

788* Some Recent Advances in Interferometric Study of Surface Shape. (English.) Bert Edenholm and Erik Ingelstam. *IVA Tidskrift for Teknisk-Vetenskaplig Forskning*, v. 25, no. 5, 1954, p. 194-203.

A review; multiple beam interferometry is compared with stylus techniques. Diagrams, photographs.

789* Industrial Metal Detectors With Special Reference to Sorting of Ores and Coal. (English.) T. G. Charles. *IVA Tidskrift for Teknisk-Vetenskaplig Forskning*, v. 25, no. 5, 1954, p. 209-220.

Earlier detectors, operation of new detector, and its applications to automatic tramp metal removal and grading of ores and coal. Diagrams, circuits, graphs, photographs. 8 ref.

790* The Torductor and the Pressductor, Two Magnetic Stress-Gauges of New Type. (English.) Orvar Dahle. *IVA Tidskrift for Teknisk-Vetenskaplig Forskning*, v. 25, no. 5, 1954, p. 221-238.

Illustrates uses for these rugged detectors which require no electronic amplification. Graphs, photographs, diagrams. 4 ref.

791* Method for Determining the Viscoelastic Properties of Dilute Polymer Solutions at Audio-Frequencies. Karl Sittel, Prince E. Rouse, Jr., and Emerson D. Bailey. *Journal of Applied Physics*, v. 25, Oct. 1954, p. 1312-1320.

Use of torsion pendulums and photoamplifiers. Diagrams, circuits, tables, graph. 6 ref.

792 A Sensitive Recording Extensometer. G. R. Hyde. *Journal of Scientific Instruments*, v. 31, Sept. 1954, p. 313-314.

Describes instrument used to obtain load-extension curves on fibers with an accuracy of a few %, and with a load limit of 250 mg. Diagrams.

793 A Reflectometer for the Assessment of Surface Texture. J. Halling. *Journal of Scientific Instruments*, v. 31, Sept. 1954, p. 318-320.

Describes simple optical-mechanical instrument which gives a rapid assessment of the surface texture of machined surfaces. Photographs, diagram, graph. 6 ref.

794 A Geiger Counter X-Ray Crystal Spectrometer. P. J. A. McKeown and A. R. Ubbelohde. *Journal of Scientifice Instruments*, v. 31, Sept. 1954, p. 321-326.

Design and construction of a Geiger-Müller X-ray spectrometer suitable for the study of transitions in single crystals. Photographs, diagrams, circuits. 12 ref.

795 The Application and Limitations of the Edge-Diffraction Test for Astigmatism in the Electron Microscope. M. E. Haine and T. Mulvey. *Journal of Scientific Instruments*, v. 31, Sept. 1954, p. 326-332.

Includes graphs, diagram, micrographs. 16 ref.

796 Instruments for Measuring Air Flow and Metering Air. Knowlton J. Caplan. *Heating and Ventilating*, v. 51, Nov. 1954, p. 89-100.

Includes diagrams, tables, graphs, photographs.

797* An Optical Shadow-Casting Microscope Technique. S. Tolansky. *Laboratory Practice*, v. 3, Oct. 1954, p. 405-409.

Uses a slide with an etched Ag surface and point source illumination for shadow magnifications of 2000 to 6000x. Micrographs. 1 ref.

798* New Thickness Gages for Metallic Coatings. *Metal Finishing*, v. 52, Oct. 1954, p. 52-55.

Three nondestructive instruments developed by the National Bureau of Standards. Photographs. 7 ref.

799* Moving Iron Ratiometer. W. Horath. *Microtecnic (English Ed.)*, v. 8, no. 4, 1954, p. 228-233.

Description of an oil-damped signal light recording instrument of moderately high natural frequency. Diagram, photographs, graphs. (To be continued.)

800* (Riderless Microbalance.) **Eine Mikrowaage ohne Balkenreiter.** O. Pfundt. *Mikrochimica Acta*, 1954, no. 5, p. 539-544.

Describes apparatus designed for a max. load of 10 or 20 g. Photograph. 2 ref.

801 Comparative Performance of Nickel and Porous Alumina Sample Holders for Differential Thermal Analysis. T. L. Webb. *Nature*, v. 174, Oct. 9, 1954, p. 686-688; disc. p. 688-689.

Includes graphs. 12 ref.

802 Cine Spectrograph. Donald J. Lovell, Harold S. Stewart, and Seymour Rosin. *Optical Society of America, Journal*, v. 44, Oct. 1954, p. 799-803.

Device for rapid photography of changing spectra. Photographs, spectrograms, diagrams. 3 ref.

803* Process Control Instrumentation. G. C. Ehemann. *Paper Mill News*, v. 77, Oct. 9, 1954, p. 48, 51-52, 54.

Economic and technical fundamentals for selecting control equipment in paper manufacture.

804 New Viscometer Solves Old Problems. J. J. Watt and C. E. Headington. *Petroleum Refiner*, v. 33, Oct. 1954, p. 121-125.
New instrument is accurate, easy to manipulate, and sturdy. Diagrams, tables, graphs, photograph. 11 ref.

805 A New Instrument for Measuring Stress in Electrodeposits. Joseph B. Kushner. *Plating*, v. 41, Oct. 1954, p. 1146-1153; disc., p. 1153.
Description and theory of Stresometer. Data for various metal deposits. Diagrams, tables, graphs. 9 ref.

806 A Copper Resistance Temperature Scale. T. M. Dauphinee and H. Preston-Thomas. *Review of Scientific Instruments*, v. 25, Sept. 1954, p. 884-886.
Excellent thermal contact achieved by fine commercial Cu wire, attached with Formel varnish to a Cu base, which has sufficiently stable and reproducible resistance temperature characteristics to be used as a resistance thermometer in the temperature range 20-320 K. Graphs, table. 4 ref.

807 A Tuned Galvanometer Amplifier. J. R. Beattie and G. K. T. Conn. *Review of Scientific Instruments*, v. 25, Sept. 1954, p. 888-891.
Amplifier suitable for the amplification of signals from a radiation thermocouple used with a L.F. interrupter. Amplification is sufficient to reveal thermal (Johnson) noise in the thermocouple. Graphs, circuit diagrams. 15 ref.

808 A Thermostatic Chamber for the Measurement of Light Scattering From Solids at Elevated Temperatures. John J. Keane and Richard S. Stein. *Review of Scientific Instruments*, v. 25, Sept. 1954, p. 892-894.
Zimm type light scattering apparatus, to determine scattering from polymer films at temperatures between 30 and 200 C at angles between 10° and 70° from the incident beam. Diagrams, graph. 4 ref.

809 A Two emf Method for the Comparison of Resistances. Harold J. Hoge. *Review of Scientific Instruments*, v. 25, Sept. 1954, p. 902-907.
Permits continuous observation or recording of resistance without error due to uncontrolled changes in the resistances of the connecting leads; readings are obtained directly. Circuit diagrams. 4 ref.

810 Differential Conductance Manometer. J. R. Pappenheimer. *Review of Scientific Instruments*, v. 25, Sept. 1954, p. 912-917.
Principle, construction, and applications of instrument designed to measure and record rapid changes of pressure and differential pressures in liquid systems. Diagrams, tables, graphs, photograph. 11 ref.

811 Photoelectric Comparator for Measuring Oscillograms. H. Bruce Phillips. *Review of Scientific Instruments*, v. 25, Oct. 1954, p. 971-976.
Device for accurate reading of data. Diagrams, photographs, circuit, graph.

812* Scintillation Spectrometer With Improved Response. P. R. Bell. *Science*, v. 120, Oct. 22, 1954, p. 625-626.
Use of large NaI crystal and autocoincidence circuit results in improved performance. Graphs, photograph.

813* Instrumental Drift. W. J. Youden. *Science*, v. 120, Oct. 22, 1954, p. 627-631.
Statistical analysis of differences between correct and experimentally derived values. Tables, graph. 7 ref.

814* Phase Microscopy 1950-1954. Oscar W. Richards. *Science*, v. 120, Oct. 22, 1954, p. 631-639.
Analytical review of literature. Diagrams. 205 ref.

815* Hydraulic-Leverage Principles for Magnification of Sensitivity of Gas Change in Free and Fixed-Volume Manometry. Dean Burk and George Hobby. *Science*, v. 120, Oct, 22, 1954, p. 640-648.
Method of achieving high sensitivity in commercial manometers by making minor changes in the equipment. Diagrams, photographs. 10 ref.

816* The Sperry Gyrotron Vibratory Gyroscope. *Shell Aviation News*, 1954, no. 194, Aug., p. 20-21.
Description of instrument employing U-shaped prongs which vibrate like a tuning fork performing the same function as the spinning wheel which operates the conventional gyroscope. Photographs, diagrams.

817* A Rapid-Scanning Microdensitometer. W. R. J. Brown. *Society of Motion Picture and Television Engineers, Journal*, v. 63, Oct. 1954, p. 147-150; disc., p. 150.
Principle and application of a simple microdensitometer, used in conjunction with a normal microscope. Photographs, graph, diagram, circuit. 5 ref.

818* (The Gripping of Cylindrical Tensile-Test Specimens With Glass-Smooth Surfaces.) **Zum Einspannproblem zylindrischer Zugproben mit glasglatter Oberfläche.** H. Isken. *Sprechsaal*, v. 87, no. 19, Oct. 1954, p. 479-481.
Use of mixture to be cast into a cone jacket to hold smooth specimens. Diagrams, graph.

819* (Microcondition of Surface. Status of Measuring Technique.) **Die Oberflächen-Feingestalt. Stand der Messtechnik.** J. Perthen. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 25, Sept. 1, 1954, p. 855-863.
Types of viewers, scanners, interference microscopes, electrical and electronic recorders for studying surface conditions. Graphs, photographs, diagrams. 19 ref.

820* (Instrument for Measuring Static and Alternating Elongation as Well as Materials Damping.) **Gerät zum Messen statischer und wechselnder Dehnung sowie der Werkstoffdämpfung.** W. Krägeloh. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 25, Sept. 1, 1954, p. 864-866.
Instrument with two strain gages for simultaneous recording of elongation, applied load, and damping properties of statically or dynamically stressed materials. Circuit diagram, table, graphs, photographs, oscillograms. 4 ref.

821* (Current Densities of Field Emission and Surface Field Intensity in Field-Emission Microscopes as Well as Methods of Determining the Geometry of the Cathodes, the Magnification, and the Resolving Power.) **Feldemissions-Stromdichten und Oberflächenfeldstärken bei Feldemissionsmikroskopen sowie Methoden zur Bestimmung des Spitzenradius, der Spitzenform, der Vergrösserung und des Auflösungsvermögens.** Michael Drechsler and Erwin Henkel. *Zeitschrift für angewandte Physik*, v. 6, no. 8, Aug. 1954, p. 341-346.
Experimental and mathematical re-examination shows errors in the previous methods of determining above. New methods of establishing these factors are shown to agree with experimental results. Diagrams, graphs, micrographs. 10 ref.

822* (Investigations With the Aid of a Rotating Device Mounted on the Counting-Tube Goniometer.) **Untersuchungen mit Hilfe eines Drehaufsatzes am Zählrohr-Goniometer.** Fritz Ebert. *Zeitschrift für Metallkunde*, v. 45, no. 9, Sept. 1954, p. 562-567.
Design and operation of simple device to determine orientations of polycrystallites, lattice constants, slippages, torsions, lattice deformations, disturbances, etc. Photographs, rotation diagrams, graphs. 4 ref.

Books and Miscellaneous Publications

823 Optical Instrumentation. George S. Monk and W. H. McCorkle, editors. National Nuclear Energy Series. 262 p. 1954. McGraw-Hill Book Company, Inc., New York. (QC787.06 M74o)
Part I covers fundamental problems and their solutions and part 2 presents typical instruments and technical processes

See also:
178 (viscometers)
194 (oil refinery instrumentation)
346 (measurement of light scattering)
381 (measurement of plating thickness)
464 (electrical instruments)
495 (bar-magnet velocity meter)
520 (spiral contractometer)

Instrumentation and Laboratory Apparatus

553 (measurement of field strength)
594 (recording analytical balance)
774 (documentation of instrumentation literature)
826 (microviscometer)
1076 (temperature-compensated strain gages)
1079 (extensometer design)
1143 (instruments for measuring tool wear)
1176 (X-ray spectrogoniometer)
1238 (measuring intensity of ultrasonic waves)
1262 (neutron spectrometer)
1268 (nuclear instrumentation)
1332 (logarithmic photometer)
1344 (frequency meter)
1345 (optical losses in microscopes)
1349 (construction of nomograms)
1350 (luminosity of spectrometers)

LUBRICATION AND FRICTION

824* Lubrication of Modern Printing Machinery. A. F. Brewer. *American Printer*, v. 135, Nov. 1954, p. 27-31.

Press bearings; lubricants. Photographs, diagrams.

825 Principles of Elution Chromatography as Applied to Separation of Lubricating Oil Components. Glenn E. Irish and August C. Karbum. *Analytical Chemistry*, v. 26, Sept. 1954, p. 1445-1451.

Rapid separation is possible on basis of aromaticity but class separation is slow. Table, graphs. 17 ref.

826 A Ball and Cup Absolute Microviscometer. P. D. Garn and W. E. Campbell. *Analytical Chemistry*, v. 26, Oct. 1954, p. 1609-1613.

Sample of 0.035 ml. is required for an accuracy of ±2%. Photographs, tables, graphs, diagrams. 8 ref.

827* (Contribution to the Investigation of the Structures of Mineral Fats.) **Ein Beitrag zur Strukturuntersuchung von Mineralfetten. II.** (Determining the Mechanical Strength and Temperature Stability of Lubricating Greases by the Rheological Method.) **Zur Bestimmung der Walkfestigheit und Temperatur=beständigkeit von Schmierfetten auf rheologischem Wege.** G. Keil and W. Presting. *Chemische Technik*, v. 6, no. 8, Aug. 1954, p. 436-441.

Laboratory tests on the quality of lubricants by determining their viscosity, flow point, thixotropic regeneration, and temperature resistance. Graphs, tables, diagram, photographs. 14 ref.

828* (Investigation of the Relation Between the Force of Friction and "Elementary Forces".) **Issledovanie sviazi mezhdu siloi treniia i "elementarnymi silami".** A. V. Bulgadaev. *Doklady Akademii Nauk SSSR*, v. 97, no. 5, Aug. 11, 1954, p. 805-808.

Effects of different loads on friction between dry and lubricated surfaces of various degrees of smoothness. Graphs.

829 Synthetic Lubricants From Polyhydroxystearic Acids. L. E. Gast, C. B. Croston, W. J. Schneider, and H. M. Teeter. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2205-2208.

Preparation of new derivatives of long-chain fatty acids and a preliminary evaluation as low-temperature lubricants. Tables. 11 ref.

830 Pumpability of Steel Mill Greases. I. J. S. Aarons. **II.** W. G. Warren. *Iron and Steel Engineer*, v. 31, Oct. 1954, p. 67-72; disc., p. 72.

Testing unit for grease properties. Photographs, diagram, tables.

831 Activated Alumina for the Maintenance of Gas Engine Crankcase Oils. L. B. Sargent, Jr. and E. M. Kipp. *Iron and Steel Engineer*, v. 31, Oct. 1954, p. 73-76.

Filtering materials. Photograph, tables, graphs.

832 Non-Soap Thickeners of Lubricating Oils. I. Sedimentation Volumes. Sydney Ross and Harold F. Schaeffer. *Journal of Physical Chemistry*, v. 58, Oct. 1954, p. 865-868.

Studied in water-miscible dioxane and in water-immiscible cyclohexane. Photograph, graphs, table. 10 ref.

833* Industrial Bearing Lubrication. *Lubrication*, v. 40, Oct. 1954, p. 117-128.

Bearing design, surface, overhaul; lubrication; life expectancy; porous bearings. Photographs, micrographs, diagrams, table.

834 Mixed Friction Conditions in Lubrication. D. D. Fuller. *Lubrication Engineering*, v. 10, Sept.-Oct. 1954, p. 256-261.

Reviews early work and recent findings. Graphs. 11 ref.

835 Measured Oil Film Pressure Distribution in Misalined Plain Bearings. F. W. Ocvirk. *Lubrication Engineering*, v. 10, Sept.-Oct. 1954, p. 262-265.

Depicts lubricating pressures by plaster models for the far more common misaligned condition. Photographs.

836 Synthetic Aircraft Greases. H. Schwenker, J. A. King, and J. C. Mosteller. *Lubrication Engineering*, v. 10, Sept.-Oct. 1954, p. 266-271.

Arylurea-silicone greases apply to the -65 to 450 F range. Bentone 34 and Li hydroxystearate greases show promise at 700 F. Tables, micrographs. 5 ref.

837 Engine Bearing Design Today. J. B. Bidwell. *Lubrication Engineering*, v. 10, Sept.-Oct. 1954, p. 272-281.

Today's demands on design are briefly cited. Diagrams, graphs, photographs. 6 ref.

838 Copper Alloy Bearings. J. B. Mohler. *Materials & Methods*, v. 40, Oct. 1954, p. 97-99.

Alloys and forms available; bearing properties; design factors; applications. Photographs, tables.

839 Filled Teflon for Dry Bearings. S. Ricklin and Robert R. Miller. *Materials & Methods*, v. 40, Oct. 1954, p. 112-114.

Four new compositions provide improved service under severe conditions. Photographs, tables.

840 How 10W-30 Motor Oil Performs. R. L. Overcash, W. Hart, and D. J. McClure. *Petroleum Refiner*, v. 33, Oct. 1954, p. 99-103.

Blend claims to have superior combustion chamber deposit properties, satisfactory oil consumption characteristics, maintains its viscosity and high viscosity index for normal periods of use. Graphs. 4 ref.

841 How Good Are the "New" Motor Oils? Carl W. Georgi. *Petroleum Refiner*, v. 33, Oct. 1954, p. 104-109.

Cross-graded motor oils have merits but do not warrant claim to a "new era" in engine lubrication. Graphs, tables.

842 Designing Performance Into Motor Oil. Leonard Raymond and J. F. Socolofsky. *Petroleum Refiner*, v. 33, Oct. 1954, p. 110-115.

Oil-quality best achieved by concentrating attention on performance requirements and by disregarding arbitrary classifications of specifications which impose undesirable limitations. Tables, graphs. 9 ref.

843* The Development of Synthetic Lubricants for Aircraft Gas Turbines. D. W. Bedell. *Petroleum Times*, v. 58, Sept. 17, 1954, p. 962-963, 966.

Quality requirements; military specifications; materials. Graphs, tables.

844* Multigrade Lubes Score High in Tests. *SAE Journal*, v. 62, Oct. 1954, p. 66-70.

Test results on fuel economy, wear, deposit-forming tendencies, and octane-requirement increase. Graphs, tables.

845* (Evaluation of the Effectiveness of "Premium" Additives on the Basis of Laboratory-Corrosion Tests With Hot Automobile Oils.) **Ueber die Beurteilung der Wirksamkeit von "Premium"-Additives suf Grund von Laboratoriums-Korrosionsversuchen mit heissen Automobil-Motorölen.** A.

Bukowiecki. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 20, no. 8, Aug. 1954, p. 255-263.

Tests of regular and premium motor oils to determine their corrosive effects on Pb, Cu, and Fe as functions of accessibility of air, viscosity, and type of additive. Photographs, micrographs, graphs. 19 ref.

846* (The Friction Characteristics of Non-Metallic Sleeve Bearings.) **Das Reibungsverhalten von Kunstharz-Presstoffen in Gleitlagern.** Ernst Wenger. *Stahl und Eisen*, v. 74, no. 19, Sept. 9, 1954, p. 1202-1212.

Principles of friction and lubrication. Comparison of various types of bearings. Diagrams, graphs, photographs, table. 12 ref.

847* (Optimum Microgeometry and Weight Loss Through Wear of Run-In Surfaces of a Steel-Bronze Pair.) **Ob optimal'noi mikrogeometrii i vesovom iznose prirabotannykh poverkhnostei pary stal'-bronza.** I. A. Kosenko. *Vestnik Mashinostroeniia*, v. 34, no. 8, Aug. 1954, p. 24-25.

Effects of original condition of bearing surfaces, running-in period, temperature, and coefficient of friction. Graphs.

Books and Miscellaneous Publications

848 Viscosity of Lubricants Under Pressure. Mayo D. Hersey and Richard F. Hopkins. 87 p. 1954. The American Society of Mechanical Engineers, New York. (TJ1075 H43v)

Coordinated data from 12 investigations published prior to 1951.

See also:
195 (quality of lubricating oils)
352 (monomolecular layers in lubrication)
1134 (lubricants for wire drawing)
1135 (lubricants for drawing steel bars)
1418 (plastic bearings)
1421 (plastic bearings)

MECHANICAL ENGINEERING

849 Progress in Hydraulic Design Engineering. George McLaughlin. *Aero Digest*, v. 69, Oct. 1954, p. 42-45.

Increased power, reduced weight, and improved efficiencies are meeting new demands for use of hydraulics in aircraft. Graphs, diagram, photographs.

850 Russians Apply Automation to 20-Yr-Old Machines. David Scott. *American Machinist*, v. 98, Oct. 11, 1954, p. 164-168.

Ingenious automation setup. Photographs, diagrams.

851* Remote Operation of Pipe-Line Pumping Stations. W. A. Derr and M. A. Hyde. *Applications and Industry*, 1954, no. 14, p. 190-198.

Remote control and indicating systems. Equipment protection. Diagrams, photographs. 13 ref.

852 Limit Analysis and Design. D. C. Drucker. *Applied Mechanics Reviews*, v. 7, Oct. 1954, p. 421-423.

Determination of load-carrying capacity of a given design for machine and structural elements and assemblies. Theorems derived for an elastic ideally plastic material. 43 ref.

853* (Stress Analysis. Measuring Stresses by Resistance Strain Gages.) **L'extensométrie. Mesure des contraintes par jauges à fil résistant.** R. Vessereau. *Chaleur & Industrie*, v. 35, no. 350, Sept. 1954, p. 241-255.

Description of gages; production problems; applications. Diagrams, photographs.

854 Key to Automatic Weighing. *Chemical Engineering*, v. 61, Nov. 1954, p. 292, 294.

Device handles incoming bulk flow, controls flow, records weights of carload lots. Diagram.

855 Centrifugal Pump Shafts and Shaft Sleeves. Igor J. Karassik and Roy Carter. *Heating and Ventilating*, v. 51, Oct. 1954, p. 95-98.

Discussion of critical speeds, shaft deflection, and design. Diagrams. (To be continued.)

856* On the Graphical Solution of Transient Vibration Problems. R. E. D. Bishop. *Institution of Mechanical Engineers, Proceedings*, v. 168, no. 10, 1954, p. 299-312; disc., p. 312-322.

Simplified approach to multi-degree-of-freedom systems leading to the treatment of transient loading of beams by moving and moving-and-varying loads. Diagrams, tables, graphs. 25 ref.

857* Determination of Loads in the Presence of Thermal Stresses. Samuel Levy. *Journal of the Aeronautical Sciences*, v. 21, Oct. 1954, p. 659-664.

Equations for determining the axial load, shear load, and bending moment from the output of gages located at specified positions on aircraft structures. Diagrams,. 2 ref.

858 Automatic Machine Control. E. M. Jones and J. V. Metzger. *Machine Design*, v. 26, Oct. 1954, p. 179-183.

Use of electrical signals for performance indication and control. Diagrams, photograph, table.

859 Clearance Design in Hydraulic Pumps and Motors. Warren E. Wilson. *Machine Design*, v. 26, Oct. 1954, p. 249-256.

Optimum clearances for hydraulic devices, considering heat generation in slip passages. Graphs, diagram. 4 ref.

860 Relative Strengths and Densities of Some Engineering Materials. *Materials & Methods*, v. 40, Oct. 1954, p. 143.

Data sheet on mechanical and physical properties of some metals, plastics, wood, and ceramic materials.

861* Diffusion Pumps. A. S. Darling. *Mechanical World and Engineering Record*, v. 134, Oct. 1954, p. 438-447.

Device for producing high vacuum on an industrial scale economically and rapidly. Graphs, diagrams, photograph. 13 ref.

862* The Practical Appraisal of Stress Raisers in Design. *Mechanical World and Engineering Record*, v. 134, Oct. 1954, p. 462-464.

Elimination of stress raisers is a matter of design and production technique. Diagrams, table.

863* (Stress Measurements in Non-Linear Systems of Continuum Mechanics.) **Spannungsmessungen in nichtlinearen Systemen der Kontinuumsmechanik.** H. Schlechtweg. *Naturwissenschaften*, v. 41, no. 17, Sept. 1954, p. 400.

Stress analysis of substances deviating from Hooke's law when slightly stressed. 8 ref.

864* Pumps. J. H. Boggs, E. C. Fitch, and A. T. Woods. *Petroleum Engineer (Management Edition)*, v. 26, Oct. 1954, p. B126 + 9 pages.

Fundamentals of pumping operations. Types. Installation and maintenance. Diagrams, tables, graphs, photographs. 20 ref.

865* Pumps. Tyler Hicks. *Power*, v. 98, Oct. 1954, p. 75-106.

Characteristics and applications of centrifugal, rotary, and reciprocating types. Tables, photographs, diagrams, graphs.

866* (Theoretical Study of the Response of a Damped Beam to a Sinusoidal Excitation Applied to Its Free End.) **Étude théorique de la résponse d'une poutre amortie a une excitation sinusoidale appliquée a son extrémité libre.** Madeleine Hourlier. *Recherche Aéronautique*, 1954, no. 40, July-Aug., p. 37-40.

Mathematical treatment of a homogeneous straight beam, of constant section, with internal damping proportional to the mass, excited harmonically. Diagrams.

867* Torsion of a Circular Shaft Press-Fitted With a Collar. (English.) Hideo Saito. *Technology Reports, Tôhoku University*, v. 18, 1954, p. 178-186.

Mathematical analysis of stress distribution. Diagram, table, graphs. 3 ref.

868* On a Solution of Torsion Problem of Rectangular Cross-Section by Trefftz's Method. (English.) Miki Ishii.

Mechanical Engineering

Technology Reports, Tôhoku University, v. 18, 1954, p. 187-194.

Calculation of stress distribution. Graphs, table, diagrams. 6 ref.

869* (Research on the Heating of Shock Absorbers in Operation and Its Effects.) **Untersuchungen über die Erwärmung von Stossdämpfern im Betrieb und deren Auswirkung.** P. Koessler and H. J. Beermann. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 26, Sept. 11, 1954, p. 891-894.

Measurement of temperature and temperature distribution of shock absorbers. Effect of increased temperature on shock-absorbing properties, and on wheel-road contact of a vehicle. Diagram, graphs. 3 ref.

870* (Comparsion Between Drives With Gear-Wheel Transmissions and Föttinger Drives.) **Vergleich zwischen Triebwerken mit Zahnrad-Wechselgetriebe und Föttinger-Wandler auf Grund gemessener Fahrleistungen.** R. Knaak. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 26, Sept. 11, 1954, p. 899-903.

Comparison of fuel comsumption of busses operated with gear-wheel transmissions and with different sizes of hydraulic drives. Graphs, photographs, diagrams.

871* (The Behavior of Materials as a Problem in Design and Production.) **Das Werkstoffverhalten als Problem zwischen Konstruktion und Fertigung.** H. Wiegand. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 27, Sept. 21, 1954, p. 927-932.

Fabrication properties of different steels and other metals with various surface conditions and surface treatments. Forming and welding procedures. High temperature and fatigue resistance. Stresses importance of co-operation between the supplier, designer, and production engineer. Diagrams, graphs, tables. 7 ref.

872* Designing, Building and Maintaining Centrifugal Pumps. II. Pump Castings. Roy Carter and Igor J. Karassik. *Water & Sewage Works*, v. 101, Oct. 1954, p. 437-441.

Includes photographs, diagrams.

873* (On the Theory of Grinding Processes.) **Zur Theorie der Mahlvorgänge.** Ludwig Bass. *Zeitschrift für angewandte Mathematik und Physik*, v. 5, no. 4, July 1954, p. 283-292.

Theory of processes is developed through a partial integro-differential equation. 7 ref.

874* (Torsional Vibrations With Consideration of Mass and Damping of Elastically Stressed Parts.) **Torsionsschwingungen unter Berücksichtigung der Masse und der Dämpfung der elastischen Glieder.** Yian-Nian Chen. *Zeitschrift für angewandte Mathematik und Physik*, v. 5, no. 4, July 1954, p. 293-316.

Mathematical treatment of stress analysis and graphic method of determining the characteristic frequency of undamped systems. Diagrams. 1 ref.

Books and Miscellaneous Publications

875 Automation Symposium. 32 p. 1953. American Society of Mechanical Engineers, New York. (TJ215 Am 35a)

Four separately paged papers on opportunities, problems, and advantages of the automatic factory. Graphs, diagrams, photographs.

876 Standards in a Changing World. Fourth National Standardization Conference, Proceedings. 74 p. 1953. American Standards Association, Inc., New York. (T59 N21p)

Advantages, examples, and applications of standards for manufacturing, design, procurement, and inventory control.

877 Compressed Air Handbook. Compressed Air and Gas Institute. 2nd Ed. 370 p. 1954. McGraw-Hill Book Company, Inc., New York. (TJ985 C73c2)

Reference book on all phases of industrial air and gas compressors and compressed-air-powered portable tools and rock drills used by industry.

878* An Annotated Bibliography of Submarine Technical Literature, 1557 to 1953. Committee on Undersea Warfare—National Research Council. Publication No. 307. 261 p. 1954. National Academy of Sciences, Washington, D. C. (ZVM365 N21a)

Represents first overall survey since World War I; earliest reference is about 430 B.C.

See also:
198 (sea water as industrial coolant)
483 (sodium pump)
487 (systematic mechanism design)
683 (effects of underwater explosions)
1100 (stress analysis of building frameworks)

METALLURGY

879 Metallurgical Effects of Ultrasonic Waves. Egon A. Hiedemann. *Acoustical Society of America, Journal*, v. 26, Sept. 1954, p. 831-842.

Survey includes: vibration treatment of melts, mechanical vibrators, electromechanical transducers, induced electrical currents, ultrasonic treating, grain size, dispersion, and rate processes. Diagrams, drawings, micrographs, graphs, macro-etchings. 121 ref.

880 Design Specifications for Stainless Steel, Type 301. E. W. Hammer and R. E. Petersen. *American Iron and Steel Institute, Preprint*, 1954, 22 p. (TS300 Am35ta)

Tentative specifications for various applications. Data for design of columns. Diagrams, graphs.

881 Steel Quality. Charles M. Parker. *American Iron and Steel Institute, Preprint*, 1954, 13 p. (TS300 Am35ta)

General discussion of factors involved for various grades of steel.

882 Some 12 Per Cent Chromium Alloys for 1000 F to 1200 F Operation. D. L. Newhouse, B. R. Seguin, and E. M. Lape. *ASME, Transactions*, v. 76, Oct. 1954, p. 1107-1120; disc., p. 1120-1122.

Composition; heat treatment; tempering effects; stress-corrosion; nitriding; welding. Tables, graphs, micrograph. 9 ref.

883* The Metallurgy of Hot-Formed Springs. W. O. Beale and C. G. Lowth. *Australasian Engineer*, 1954, Aug., p. 54-58; disc., p. 58-61.

Springs manufactured from hot-rolled bar stock and the merits of the various grades of steel. Metallurgical aspects of steel making, rolling, spring manufacture, and finished springs in relation to their service requirements. Graphs, diagrams, table. 4 ref.

884* Chromium and Chromium-Rich Alloys. A. M. Sully. *Birmingham Metallurgical Society, Journal*, v. 34, Sept. 1954, p. 112-127.

Production; physical, chemical, and mechanical properties. Micrographs, graphs, diagram, photograph. 8 ref.

885 Preparation and Constitution of Copper-Boron Alloys. F. Lihl and O. Fleischl. *Henry Brutcher, Altadena, Calif., Translation no.* 3309, 23 p. (From *Metall*, v. 18, nos. 1-2, Jan. 1954, p. 11-19.)

Previously abstracted from original. See item 6719, v. 3, May 1954.

886* Titanium in Canada. Laura Tatham. *Canadian Business*, v. 27, Oct. 1954, p. 26-29.

General review of refining problems, properties, and applications. Photograph.

887 Tantalum. A. F. G. Cadenhead. *Canadian Metals*, v. 17, Oct. 1954, p. 24.

Sources; chemical, physical, and mechanical properties; uses.

888* Some Views on the Present Position and Future of Electro-Metallurgy in India. E. H. Bucknall. *Central Electrochemical Research Institute, Karaikudi, Bulletin*, v. 1, July 1954, p. 6-18.

General review of present status, research underway, and predictions of future expansion. Tables. 19 ref.

889 An Appraisal of Cold-Reduced Electrical Steels. D. W. Thompson and G. R. Hemmeter. *Electrical Manufacturing*, v. 54, Oct. 1954, p. 80-84.

Comparison of cold-rolled versus hot-rolled sheets. Fabrication; properties; structure; performance characteristics. Micrographs, graphs, photograph.

890* (Progressive Induction Melting.) **Fortschrittliches induktives Schmelzen.** Ernst von Kannen. *Giesserei*, v. 41, no. 18, Sept. 2, 1954, p. 456-459.

Design of line-frequency induction furnaces and comparison with other types of furnaces; operation, advantages, and power consumption. Photographs, diagrams, table.

891* (Reprocessing of Aluminum Scrap.) **Przeróbb złomu aluminiowego.** Marian Orman. *Hutnik*, v. 21, no. 7, July 1954, p. 229-239.

Types of scrap; sorting, remelting, and refining methods. Equipment. Diagrams, graphs, tables. 10 ref.

892 Aluminum Alloys. Harry W. Fritts. *Industrial and Engineering Chemistry*, v 46, Oct. 1954, p. 2045-2052.

Review of the development of existing applications and new products for the process and other industries. Photograph. 135 ref.

893 Copper and Copper Alloys. Raphael Katzen. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2065-2066.

Review of significant new developments and new data which have accumulated during past 3 yr. Photograph. 11 ref.

894 Iron, Mild Steels, and Low-Alloy Steels. Homer L. Shaw. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2084-2087.

Review of developments in iron, and mild and low-alloy steels during 1953, which are of interest to the chemical industry. 64 ref.

895 Lead and Lead Alloys. Kempton H. Roll. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2088-2091.

Research progress, engineering applications, and technological advancements during past yr. 35 ref.

896 Nickel and High-Nickel Alloys. H. O. Teeple. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2092-2107.

Review of physical and mechanical properties; corrosion resisting characteristics and their significance to solving industrial problems. 200 ref.

897 Stainless Steels and Other Ferrous Alloys. Walter A. Luce. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2114-2124.

Corrosion; mechanical properties and structure; high temperature properties; welding; metal working; surface treatment. Photographs. 167 ref.

898 Tin and Its Alloys. Robert J. Nekervis. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2124-2127.

Tin as a replacement for Ni in electrocoating and Cu alloys; new Sn-containing materials; coating methods; corrosion resistance. Photographs. 56 ref.

899 Less Common Metals. W. R. Bekebrede and L. F. Yntema. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2130-2135.

Literature review of 1954 on Ti, Mo, Zr, and Ta as materials of construction. Photographs. 35 ref.

900 High-Strength Weldable Steel. W. E. Bardgett and L. Reeve. *Iron & Steel*, v. 27, Oct. 1954, p. 479-485.

Development of Fortiweld (low-alloy, boron-molybdenum) steel from 1949 to 1953. Effects of composition and heat treatment on mechanical properties. Tables, graphs. (To be concluded.)

901 Increasing Civilian Applications for Aluminum. George Perkins. *Light Metal Age*, v. 12, Oct. 1954, p. 16-17.

Sheet, foil, and castings in various applications. Photograph.

902 Use of Beryllium in Light Metals. E. A. Smith, Jr. *Light Metal Age*, v. 12, Oct. 1954, p. 24-27, 37.

Small additions of Be make alloys more workable, stronger, and harder by improving melt characteristics. Graph, photograph.

903 Lower-Nickel Stainless Steel Castings. J. Lomas. *Machinery Lloyd (Overseas Ed.)*, v. 26, Sept. 25, 1954, p. 83, 85.

Properties and application of 21% Cr, 9% Ni alloys.

904 Age-Hardenable Metals. John L. Everhart. *Materials & Methods*, v. 40, Oct. 1954, p. 121-136.

Age-hardening processes and mechanical and physical properties of light metals, heavy non-ferrous alloys, irons, steels, and superalloys. Photographs, table.

905 Lead and Lead Alloys. *Materials & Methods*, v. 40, Oct. 1954, p. 139, 141.

Data sheets of physical and mechanical properties of soft and hard lead.

906* (Copper and Copper Alloys.) **Koper en koperlegeringen. XIV.** (Special Brass.) **Speciaal messing.** W. G. R. de Jager. *Metalen*, v. 9, no. 17, Sept. 15, 1954, p. 272-276.

Table of standardized alloys in Germany, England, and the United States gives compositions and mechanical properties.

907* (Extruded Products of Alloy ZnAl32Cu3.) **Strangpresserzeugnisse aus der Legierung ZnAl32Cu3.** J. Schramm. *Metall*, v. 8, nos. 19-20, Oct. 1954, p. 773-778.

Compositions, structures, mechanical properties, and uses. Graphs, tables. 9 ref.

908* (On the Conservation of Copper in Aluminum Alloys.) **Über die Einsparung von Kupfer in Aluminiumlegierungen.** Georg Schichtel. *Metallurgie und Giessereitechnik*, v. 4, no. 8, Aug. 1954, p. 375-376.

Brief discussion of modern German practice of producing cast and malleable Al alloys with little or no Cu. Tables.

909 Rare Earths in Stainless Steels. Howard O. Beaver. *Metal Progress*, v. 66, Oct. 1954, p. 115-119.

Residuals from misch metal are necessary to correct brittleness at forging ranges. No detrimental effects to other physical properties. Graphs, tables.

910 A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging*, v. 21, Sept. 1954, p. 413-419.

Defines "Nilvar" to "notch". Tables, photographs, diagrams, micrograph, circuit. (To be continued.)

911* Aluminum Foil in Transformer Coils. Albert Zack. *Modern Metals*, v. 10, Oct. 1954, p. 35-37.

Use of foil eliminates need for fine wire in wafer coils and simplifies winding operation. Photographs, diagrams, graph.

912* Aluminum in the Fishing Industry. *Modern Metals*, v. 10, Oct. 1954, p. 42 + 4 pages.

Applications on boats and all types of fish handling equipment. Photographs, diagrams.

913* Saving Machining Costs With Aluminum Castings. W. J. Evans. *Modern Metals*, v. 10, Oct. 1954, p. 68-69.

Advantages of Al over cast iron. Photographs.

914* Titanium in Air-Borne and Lightweight Army Equipment. T. E. Perry. *Modern Metals*, v. 10, Oct. 1954, p. 75-76, 78-79.

Fabrication and design solutions developed by the Army and its contractors. Photographs.

915 A New Frontier in Metals. Bruce W. Gonser. *Monthly Business Review*, 1954, Oct., p. 12.

Effects of extremely small or trace amounts of impurities on the properties of metals. The new frontier is the study of metals of more than 99.9% purity.

916 How Many Pounds of Zinc Die Castings Go Into Today's Cars? *Precision Metal Molding*, v. 12, Nov. 1954, p. 39-41.

Consumption data and typical applications. Graph, photographs.

Metallurgy

917 Which Beryllium Copper Alloy for Your Casting? J. T. Richards. *Precision Metal Molding*, v. 12, Nov. 1954, p. 42-43, 88-89.

Composition, physical and mechanical properties of three alloys. Photographs, table.

918* (Sets of Extruded Bars in First and Second Class Installations.) **Les jeux de barres en profilés dans les installations de première et deuxième catégories.** René Rols. *Revue de l'Aluminium*, v. 31, no. 212, July-Aug. 1954, p. 225-230.

Economics and range of application of U-shaped extruded Al bus bars; electrical and mechanical design; special techniques of installation. Diagrams, tables, graphs. (To be continued.)

919* Good Commercial Nodular Irons Rival Steel in Strength, Ductility. Richard Schneidewind. *SAE Journal*, v. 62, Oct. 1954, p. 94-96.

Attractive properties for automotive and tractor parts. Castability superior to that of steel and malleable iron. Table, graph.

920* (New Copper Alloys, Especially for the Production of Cast Parts.) **Neue Kupferlegierungen, besonders für die Herstellung von Gussteilen.** Eugen Vaders. *Zeitschrift für Metallkunde*, v. 45, no. 9, Sept. 1954, p. 528-533.

Copper-As, Cu-Sb, and Cu-Pb-Si alloys with strength, bearing, and wear-resistance properties superior to those of Cu-Sn bronzes. Suitability of new alloys for chill castings with smooth, oxide-free surfaces. Tables, micrographs, photographs. 7 ref.

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921 Iron and Steel. B. R. Davidson, R. W. Nichols, and C. J. Leadbeater. Paper from REPORTS ON THE PROCESS OF APPLIED CHEMISTRY. p. 171-193. 1953. Society of Chemical Industry, London. (TP1 So13r)

Review of developments in Great Britain in steels and Fe alloys. Covers properties, surface treatments, and powder metallurgy. 178 ref.

922 (The Metallurgy of the Ferrous Alloys.) **Die Metallurgie der Ferrolegierungen.** R. Durrer and G. Volkert, compilers. 409 p. 1953. Springer Verlag, Berlin. (TN756 D93m)

A collection of 23 papers covering history, methods of smelting iron ore, furnaces, and metallurgy of 12 iron alloys.

923 Stainless Iron and Steel. J. H. G. Monypenny. v. II. 3rd Rev. Ed. Microstructure and Constitution. 330 p. 1954. Chapman & Hall Ltd., London. (TN757.C5 M76s3)

Metallography of stainless and heat-resisting steels. Effects of various alloy additions. Behavior of various alloys in special conditions.

924* The Light Metals Handbook. George A. Pagonis. v. I-II. 199 and 185 p. 1954. D. Van Nostrand Company, Inc., New York. (TN775 P14L)

Volume I contains text, and volume II tabular data on Al- and Mg-base alloys. Includes analyses, chemical reaction characteristics, mechanical properties, heat treatment, casting and forming characteristics, and joining methods.

925 Electrochemical and Electrometallurgical Industries. H. D. C. Rapson. Paper from REPORTS ON THE PROGRESS OF APPLIED CHEMISTRY. p. 243-266. 1953. Society of Chemical Industry, London. (TP1 So13r)

Surveys British studies of electrodeposition and metal finishing; and studies of electro-refining of In, Zn, Sb, Fe, Ti, and Al. 251 ref.

926 Non-Ferrous Metals: Physical Metallurgy. T. Ll. Richards, G. K. Williamson, and D. E. Yeomans. Paper from REPORTS ON THE PROGRESS OF APPLIED CHEMISTRY. p. 208-221. 1953. Society of Chemical Industry, London. (TP1 So13r)

Review of progress in British studies of mechanical properties; recovery and recrystallization; and constitution and structure of alloys. 184 ref.

927 Nonmetallic Minerals. John D. Sullivan. Paper from CENTENNIAL OF ENGINEERING, 1852-1952. HISTORY AND PROCEEDINGS OF SYMPOSIA. p. 567-577. 1953. Museum of Science and Industry, Chicago. (T23 C33)

Review of the engineering status of certain minerals and their applications. Tables, graphs. 4 ref.

928 Symposium on Aluminium in Building. 130 p. 1954. Aluminium Development Association, London. (TA480.A6 AL82s)

Consists of three papers covering applications in building frameworks, roofing, and trim.

929 Ultra High Strength Steels in Aircraft Applications. 73 p. 1953. Society of Automotive Engineers, Inc., New York. (TL699.58 So13s)

Includes six papers covering development, heat treatment, and processing of alloy steels for special applications.

See also:
168 (materials of construction)
1211 (applications of cemented carbides)

METALS—EXTRACTION AND REFINING

930 The Chemical Behavior of Silicon in the Iron Blast Furnace. James C. Fulton. *American Iron and Steel Institute, Preprint*, 1954, 14 p. (TS300 Am35ta)

Reactions involving S and Si under various operating conditions. Graphs, table, diagrams. 20 ref.

931* The Application of Thermodynamics to the Control of the Iron Blast Furnace. K. T. Goodchild. *Birmingham Metallurgical Society, Journal*, v. 34, Sept. 1954, p. 87-111.

Free energy change data explain reactions and conditions for their control. Diagrams, tables, graphs. 5 ref.

932 Desulphurizing With Solid Lime. Sven Eketorp. *Blast Furnace and Steel Plant*, v. 42, Oct. 1954, p. 1159-1161, 1177.

Treatment of pig iron in a rotating furnace with finely ground burnt lime reduces S content to 0.001%. 6 ref.

933 Rammed Ports and Front Walls in Open-Hearth Furnaces. V. N. Litvishko. *Henry Brutcher, Altadena, Calif., Translation no.* 2794, 3 p. (From *Stal*, v. 6, nos. 11-12, 1946, p. 697.)

Advantages. Data on composition, preparation, and application of ramming mix; ramming practice. Performance of furnaces with partly rammed linings.

934 Trial Production of Low-Nitrogen Steels in Basic-Lined Baby Converter. K. G. Speith and H. Bücken. *Henry Brutcher, Altadena, Calif., Translation no.* 2997, 18 p. (From *Archiv für das Eisenhüttenwesen*, v. 23, nos. 9-10, 1952, p. 325-333.)

Physical and metallurgical differences between large and baby converters. Applications and advantages. Graphs. 14 ref.

935 Problems of Pig Iron Production in the Low-Shaft Furnace. K. Säuberlich and R. Baake. *Henry Brutcher, Altadena, Calif., Translation no.* 3280, 13 p. (From *Metallurgie und Giessereitechnik*, v. 4, no. 2, 1954, p. 55-60.)

Metallurgical and physical problems of furnace, ores, fuels, and slags. Design, dimensions, and special features are presented. Tables, diagrams, graph.

936 Processing of Titaniferous Magnetites Based on Reduction of Ores With a Gaseous Reducing Agent at Moderate Temperatures. E. V. Snopova and N. I. Rotkov. *Henry Brutcher, Altadena, Calif., Translation no.* 3298, 20 p. (From *Trudy Uralgeomin (Uralsk, Nauch-Issled. Instituta Geologii, Razvedoki Issledovaniya Mineral'nogo Syr'ya)*, 1938, no. 3, p. 285-293.)

Production of sponge iron; melting in H.F. furnaces, and extraction of Ti and V from the slag by chemical methods. Direct production of Fe from ilmenite by action of H and CO at moderate temperatures. Tables. 2 ref.

937 Contribution to the Study of the Metallurgy of Top Blowing. I. H. Rellermeyer and T. Kootz. *Henry Brutcher, Altadena, Calif., Translation no.* 3324, 20 p. (Abridged from *Stahl und Eisen*, v. 74, no. 7, 1954, p. 381-390.)

Previously abstracted from original. See item 9948, v. 3, July 1954.

938 Joint Pouring of Basic Bessemer and Electric Furnace Steel. E. Ritter. *Henry Brutcher, Altadena, Calif., Translation no.* 3347, 14 p. (From *Stahl und Eisen*, v. 69, no. 8, 1949, p. 258-262.)

Extensive data on compositions and mechanical properties obtained when adding low-P or low-P + low-N basic Bessemer steel to the same quantity of electric steel having double the final alloy content. Graphs, diagram. 4 ref.

939 On the Viscosity of Blast-Furnace Slags. A. M. Chernyshev, L. M. Tsylev, and A. V. Rudneva. *Henry Brutcher, Altadena, Calif., Translation no.* 3380, 21 p. (From *Izvestiya Akademii Nauk SSSR*, 1953, no. 7, July, p. 1044-1057.)

Previously abstracted from original. See item 3684, v. 3, Mar. 1954.

940* (Gas Reference Electrode for Measurement in Cryolite-Alumina Melts.) **Gazovyi elektrod sraveniia dlia izmerenii v kriolito-glinozemnykh rasplavakh.** S. I. Rempel', N. A. Anisheva, and L. P. Khodak. *Doklady Akademii Nauk SSSR*, v. 97, no. 5, Aug. 11, 1954, p. 859-862.

Variation of potential of O-C electrode during variation in current strength. Diagram, graph. 5 ref.

941 Some Observations on the Kroll Process for Titanium. F. S. Wartman, Don H. Baker, J. R. Nettle, and V. E. Homme. *Electrochemical Society, Journal*, v. 101, Oct. 1954, p. 507-513.

Mechanism of reduction process. Causes of zonal variations of hardness in crude sponge are largely due to impurities in the Mg. Photographs, tables, diagram, graph. 11 ref.

942 Extracting Zinc From Concentrates by Chlorination. John S. Sieger and Colin G. Fink. *Engineering and Mining Journal*, v. 155, Oct. 1954, p. 90-93.

Laboratory scale tests at high temperatures (650-750 C) show that Zn and Pb can be separated as volatile chlorides, leaving behind unchlorinated Fe and/or Mn. Graphs.

943* (Principal Results of the Enquiry on Ingot Molds in French Basic Bessemer Steel Plants.) **Principaux résultats de l'enquête sur les lingotières d'aciérie Thomas françaises.** Jean Duflot. *Fonderie*, 1954, no. 103, Aug., p. 4078-4090.

Investigation in 19 steel plants and 18 foundries on design, preparation, and use of ingot molds. Tables, drawings, charts. 12 ref.

944* (Trends in the Development of the Production of Aluminum by Electrolysis.) **Kierunki rozwoju produkcji aluminium za pomoca elektrolizy.** Marek Brafman. *Hutnik*, v. 21, no. 7, July 1954, p. 217-224.

Critical review of electrolysis of chlorides or of mixtures of cryolite and Al_2O_3; apparatus. Diagrams, graphs. 15 ref.

945* (Electrolytic Refinement of Aluminum.) **Elektrolityczna rafinacja aluminium.** Zofia Maślanka-Orman. *Hutnik*, v. 21, no. 7, July 1954, p. 224-227.

Electrolytes and electrolytic apparatus. Use of aircraft scrap. Polish achievements. Refinement at temperatures below melting point. Diagrams. 17 ref.

946* (Contribution to the Study of the Role of Manganese in Refining in the Basic Bessemer Converter.) **Contribution a l'étude du role du manganèse dans l'affinage au convertisseur Thomas.** M. Cassier, P. Leroy, and J. Stremsdoerfer. *Institut de Recherches de la Sidérurgie, Publications*, ser. A, no. 77, Sept. 1954, 36 p.

Preparation; correlations between composition of charge, preparation conditions and chemical characteristics of metal; ingot casting; rolling characteritics. Tables, graphs, charts. 17 ref.

947 Non-Metallic Inclusions. I. Deoxidation Products. H. B. Bell. *Iron & Steel*, v. 27, Oct. 1954, p. 493-499.

Reactions induced by Mn, Si, Al, V, Ti, Cr, B, and Zr during deoxidation of steel. Graph. 48 ref. (To be continued.)

948 Measurement and Influence of Preheat in the Open-Hearth Furnace. W. P. Cashmore. *Iron and Steel Institute, Journal*, v. 178, Oct. 1954, p. 112-121.

Apparatus and experimental technique to determine effects of amount of preheat in various types of open hearth and under various operating conditions. Graphs, diagram. 5 ref.

949 Radioactive Measurement of Valve Leakage, Infiltration, and Blowout in Open-Hearth Furnaces. E. B. Bell and D. Thomas. *Iron and Steel Institute, Journal*, v. 178, Oct. 1954, p. 122-126.

Use of radon to determine operating efficiency. Diagrams, graphs. 3 ref.

950 Investigations on Taphole Clays and Taphole Practice. W. Banks and H. M. Richardson. *Iron and Steel Institute, Journal*, v. 178, Oct. 1954, p. 138-146.

Properties of 12 commercial clays. Effects of compounding and blast furnace practice on behavior. Tables, graphs, diagram.

951* (On the Thermodynamics of Fused Salts and Slags.) **Om den termodynamiske behandling av saltsmelter og slagger.** Tormod Förland. *Jernkontorets Annaler*, v. 138, no. 8, 1954, p. 455-478.

Ion exchange equilibria; activity of a salt component in a mixture of used salts; formation of two liquid phases and deviation from random distribution of the ions in the mixture. Graphs, tables. 12 ref.

952 A Cell for the Preparation of Small Quantities of Alkali Metals. Philip S. Baker, G. F. Wells, and W. R. Rathkamp. *Journal of Chemical Education*, v. 31, Oct. 1954, p. 515-518.

Development of a miniature cell designed for the preparation of alkali metals from small amounts of their salts. Photographs, table. 13 ref.

953 Methods for Separating Rare-Earth Elements in Quantity as Developed at Iowa State College. F. H. Speeding and J. E. Powell. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Oct. 1954, p. 1131-1135.

Description and evaluation of three processes involving ion exchange resins. Graphs. 29 ref.

954 Slag-Metal-Graphite Reactions and the Activity of Silica in Lime-Alumina-Silica Slags. James C. Fulton and John Chipman. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Oct. 1954, p. 1136-1146.

Experimental data on reduction of Si from blast-furnace-type slags by C-saturated Fe; determination of conditions for formation of SiC. Graphs, tables. 18 ref.

955* Studies in Reduction of Powdered Haematite. I. Batch Reduction. II. Continuous Reduction in a Rotary Kiln. R. M. Khandwala and G. S. Tendolkar. *Journal of Scientific & Industrial Research*, v. 13, sec. B, Aug. 1954, p. 561-571.

Includes graphs, tables, diagram. 29 ref.

956* (On the Reduction of WO_3.) **Zur Reduktion von WO_3.** O. Herrmann and H. Pfisterer. *Metall*, v. 8 ,nos. 19-20, Oct. 1954, p. 759-764.

Study of the effect of ThO_2 and alkali silicate additions on the reducing process. Micrographs, graphs. 6 ref.

957* (Appearance of Surface Blisters in Bottle-Shaped Ingots Used in the Production of Wheel Tires.) **Über das Auftreten von Randblasen bei Flaschenhalsblöcken für die Erzeugung von Radreifen (Bandagen).** Arthur Schubert, Georg Wycisk, and Helmut Scholte. *Metallurgie und Giessereitechnik*, v. 4, no. 8, Aug. 1954, p. 372-374, 356-358.

Chemical analyses, mechanical tests, metallographic investigations, and re-examination of melting and casting process to determine cause of defects. Graph, photographs, micrographs.

958* Statistico-Thermodynamical Studies on the Fundamental Reactions Concerning Steel-Making. II. The Equilibrium Relationship Between Oxygen and Carbon in Liquid Iron Under Various Pressures of CO Gas. (English.) Sakae Takeuchi. *Science Reports of the Research Institutes, Tohoku University*, ser. A, v. 6, no. 3, June 1954, p. 207-219.

Computations show that departure from ideal solutions makes deoxidation by C possible only at low concentrations of C. Graphs. 11 ref.

Metals—Extraction and Refining

959* (The Evolution of the Basic Bessemer Steel Production in Europe and the Design of Basic Converter Steel Plants.) **Entwicklung der Thomasstahlerzeugung in Europa und die bauliche Ausgestaltung der Thomaswerke.** Hermann Brandi. *Stahl und Eisen,* v. 74, no. 20, Sept. 23, 1954, p. 1262-1267.

History. Principles of modern practice. Diagrams, graphs, photographs. 2 ref.

960* (New Findings and Contributions to the Metallurgy of the Basic Bessemer Process.) **Neue Erkenntnisse und Beiträge zur Metallurgie des Thomasverfahrens.** Hans Kosmider and Hermann Schenck. *Stahl und Eisen,* v. 74, no. 20, Sept. 23, 1954, p. 1281-1292.

Recent developments and improvements. Graphs. 8 ref.

961* (Susceptibility of Free Machining Rimming Basic Bessemer Steel to Defects.) **Die Fehleranfälligkeit unberuhigter Thomas-Automatenstähle.** Helmut Knüppel and Karl Ernst Mayer. *Stahl und Eisen,* v. 74, no. 20, Sept. 23, 1954, p. 1292-1299.

Effects of O, Mn, P, S, N, slag, and production variables. Graphs, tables.

962 Adding Lead to Steel—Here's How It's Done. Robert F. Huber. *Steel,* v. 135, Oct. 25, 1954, p. 150-152, 155.

Methods of adding and controlling distribution of Pb in any steel. Photographs, table.

Books and Miscellaneous Publications

963 Processing of Liquid Bismuth Alloys by Fused Salts. D. W. Bareis, R. H. Wiswall, Jr., and W. E. Winsche. Paper from NUCLEAR ENGINEERING. p. 228-237. 1954. American Institute of Chemical Engineers, New York. (QC776 Am35n)

Experiments and justification of process used in the Brookhaven Liquid Metal Fuel Reactor for extraction of fission products, and possible applications of salt metal extraction processes to Th-containing breeder blankets. Graphs, table. 5 ref.

964 Non-Ferrous Metals: Extraction and Refining. B. Fullman, editor. Paper from REPORTS ON THE PROGRESS OF APPLIED CHEMISTRY. p. 194-207. 1953. Society of Chemical Industry, London. (TP1 So13r)

Review of British developments in mineral dressing, hydrometallurgy, and smelting. 169 ref.

965 Electrolytic Preparation of Uranium From a Fluoride Bath. S. K. Kantan, N. Shreenivasan, and G. S. Tendolkar. Paper from NUCLEAR ENGINEERING. p. 63-66. 1954. American Institute of Chemical Engineers, New York. (QC776 Am35n)

With Mo as the cathode, current density 50 to 400 amp. per sq. dm., and temperature 725 to 900 C are studied; and the relative merits of the double fluoride and tetrafluoride are discussed. Graphs, tables, diagram. 2 ref.

966 Metallurgical Progress. John Taylor, P. T. Carter, and T. B. King. 80 p. 1954. Louis Cassier Co. Ltd., Dorset House, Stamford St., London, S.E.1, England. 3s., 4 1/2d. (TN705 M56)

Reprints of "Critical Reviews" from *Iron and Steel,* covering ironmaking, steelmaking reactions, and solidification of steel.

See also:
124 (burned-in openhearth bottoms)
719 (combustion in the openhearth)
1172 (physical chemistry in steelmaking)
1197 (pouring practice and ingot quality)

METALS—FINISHING, POLISHING, AND CLEANING

967* Cleaning and Polishing Heat-Exchanger Parts. Raymond H. Spiotta. *Machinery,* v. 61, Oct. 1954, p. 160-164.

Grinding, polishing, buffing, and electropolishing of stainless steel food processing equipment. Photographs.

968 Barrel Finishing Precision Machined Airframe Components. *Machinery (London),* v. 85, Sept. 17, 1954, p. 595-602.

Techniques employed by Vickers-Armstrongs for removal of tool lines and blending of surface defects. Photographs.

969* The Role of Cyanide Neutralization in the Surface Treatment of Steel. J. H. Peterson, G. M. Nichols, and W. F. McDevit. *Metal Finishing,* v. 52, Oct. 1954, p. 62-64.

Carbon-14 was used to determine amounts of cyanide retained on pickled steel. Corrosion resistance of cleaned sheets. Tables. 2 ref.

970 Cleaning of Stainless Steel for Wire Drawing. John H. Corson. *Wire and Wire Products,* v. 29, Oct. 1954, p. 1143-1144, 1146-1147.

Factors involved in make-up of oxidized surfaces and industrial cleaning practices. Tables, micrographs, photograph. 4 ref.

971* (Problem of the Composition and Mechanism of Formation of a Film on Iron Obtained by Caustic Burnishing.) **K voprosu o sostave i mekhanizme obrazovaniia plenki na zheleze, poluchennoi shchelochnym voroneniem.** I. V. Krotov. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 7, July 1954, p. 1327-1330.

Film formation as a function of time and temperature. Graphs. 4 ref.

See also:
1013 (cleaning of Al-alloy products)
1020 (cleaning of steel wire)

METALS—FOUNDRY PRACTICE

972 Foundry Facts. Analysis of Casting Defects. *American Foundryman,* v. 26, Oct. 1954, p. 67-68.

Outline of causes of gray iron casting defects. Photographs, chart.

973 Fluidity of Metals and Methods of Determining Fluidity. Yu. A. Klyachko and L. L. Kunin. *Henry Brutcher, Altadena, Calif., Translation no.* 2539, 22 p. (From *Zavodskaya Laboratoriya,* v. 15, no. 10, 1949, p. 1198-1206.)

Fluidity test data for information on mold-filling capacity of metals and alloys and on their physico-chemical characteristics and quality. Graph.

974 Sulfur Removal From Cast Iron by Treatment With Magnesium. K. I. Vashchenko, P. V. Avrinskii, and B. M. Pashkovskii. *Henry Brutcher, Altadena, Calif., Translation no.* 3386, 19 p. (From *Liteinoe Proizvodstvo,* v. 5, no. 1, 1954, p. 9-14.)

Previously abstracted from original. See item 8419, v. 3, June 1954.

975 Making Castings by Pushbutton. *Business Week,* 1954, no. 1310, Oct. 9, p. 130-132, 134.

Description of foundry operations at Eberhard Mfg. Co., Cleveland. Iron castings, averaging about 2½ lb. each are being shaken out of a completely automatic foundry at the rate of one per sec. Photographs.

976* Foundry Practice. VIII. The Cast Metal. IX. The Molten Metal. William H. Salmon and Eric N. Simons. *Edgar Allen News,* v. 33, Sept. 1954, p. 205-206.

Compression and hardness tests; defects; refractory materials. (To be continued.)

977* (Choice of Fuel for Heating of Furnaces.) **Choix du combustible pour le chauffage des fours.** *Fonderie,* 1954, no. 103, Aug., p. 4099-4101.

Discusses cost factor in selecting fuel for molding ovens, crucible furnaces, enameling, and rotary kilns. Table.

978* (Standard for Preparing A-S13 and Neighboring Alloys.) **Standard d'élaboration de l'A-S13 et des alliages voisins.** *Fonderie,* 1954, no. 104, Sept., p. 4151-4156.

Sand, and chill casting standards for Si cast iron.

979 Practical Molding Sand Control. Frank S. Brewster. *Foundry*, v. 82, Nov. 1954, p. 102-107.

Principles and laws of sand management for improvement of foundry efficiency. Photograph, graphs, table, diagrams.

980 Fundamentals of Synthetic Molding Sand. Norman J. Dunbeck. *Foundry*, v. 82, Nov. 1954, p. 108-111.

Versatility; control techniques. Photographs.

981 Naturally Bonded Molding Sand. Richard H. Olmsted. *Foundry*, v. 82, Nov. 1954, p. 112-114.

Advantages of natural sands for foundries with limited equipment. Photograph.

982 Molding Sand Use in the Gray Iron Foundry. W. G. Parker. *Foundry*, v. 82, Nov. 1954, p. 116-121.

Properties of natural and synthetic sands; guides for selection. Graph, tables, photograph. 22 ref.

983 Steel Foundry Molding Sand. John B. Caine. *Foundry*, v. 82, Nov. 1954, p. 122-125.

Specifications for various sized molds; effects of sand on casting quality. Photograph, micrographs.

984 Molding Sand Practice in the Malleable Foundry. L. E. Emery. *Foundry*, v. 82, Nov. 1954, p. 126-129.

Physical and mechanical requirements for sand system. Photographs.

985 Molding Sand in the Brass Foundry. William B. George. *Foundry*, v. 82, Nov. 1954, p. 130-133.

Factors in maintaining good sand systems. Photographs, graphs, tables.

986 Aluminum Foundry Molding Sand Use. Walter J. Klayer. *Foundry*, v. 82, Nov. 1954, p. 134-137.

Benefits of sand control. Photographs.

987 Magnesium Molding Sand. K. J. Hopp. *Foundry*, v. 82, Nov. 1954, p. 138-139.

Moisture control most important factor. Photographs.

988 Layer Method for Determining Teeming Speeds and Mould Orientation for Making Castings. Sten H. C. Forslund. *Foundry Trade Journal*, v. 97, Oct. 7, 1954, p. 407-411.

Flow of metal in various parts of the mold, formation of cold-shuts, critical rising speeds. Practical application of the test method. Diagrams, photographs, graphs. (To be continued.)

989 Founding of Marine Propellers. John M. Langham. *Foundry Trade Journal*, v. 97, Oct. 7, 1954, p. 413-414; disc., p. 414-416.

Machining, finishing, and inspection. Photographs.

990* (Lining Basic Cupola Furnaces.) **Zustellung basischer Kupolöfen.** Ernst Löbbecke. *Giesserei*, v. 41, no. 19, Sept. 16, 1954, p. 477-485.

A critical review of literature on the status of development of basic and neutral refractory materials and their possible uses in cupola furnaces with and without cooling devices. Tables, graphs, photographs, diagrams. 101 ref.

991* (Gating as a Basis of Nondefective Casting.) **Die Anschnitte als Grundlage fehlerfreier Abgüsse.** A. Bockermann. *Giesserei*, v. 41, no. 19, Sept. 16, 1954, p. 492-493.

Discusses proper and improper gating for casting different metals. Diagrams.

992* (Determination of Pouring Rate and Pouring Method by the Layer Method.) **Bestämning av gjuthastighet och gjutsätt för stål med skiktmetoden.** Sten Forslund. *Gjuteriet*, v. 44, no. 8, Aug. 1954, p. 129-138.

Effect of pouring speed on formation of cold shuts. Values of critical rising speed are obtained from which the best pouring rate for comparable castings may be determined. Diagrams, photographs, micrographs, graphs.

993* (Standards for Exchangeable Pattern Plates in Frames.) **Standardförslag för kassettbrätt.** *Gjuteriet*, v. 44, no. 8, Aug. 1954, p. 139-142.

Use of exhangeable pattern plates simplifies operation and reduces costs. Diagrams, tables.

994 High-Frequency Induction Furnaces Boost Foundry Melting Capacity, Widen Range of Metals Handled. W. D. Latiano. *Iron Age*, v. 174, Oct. 28, 1954, p. 95-98.

Integrated furnaces and power sources permit great flexibility in operations. Photographs.

995 Improved Process Control Assures Economical Production of Extra Low Carbon Cast Stainless. R. W. de Weese. *Iron Age*, v. 174, Oct. 14, 1954, p. 133-135.

Practices used in arc and induction furnaces. Photographs, tables.

996* (Casting of Steel Shot.) **Otlivka stal'noi drobi.** F. T. Efimov, F. I. Mikhalev, and P. G. Karpov. *Liteinoe Proizvodstvo*, 1954, no. 6, Sept., p. 1-3.

Casting operations and specially designed equipment for improved cast-iron and steel shot. Advantages of latter. Photographs.

997* (Casting of Permanent Magnets.) **Otlivka postoiannykh magnitov.** Ia. M. Dovgalevskii. *Liteinoe Proizvodstvo*, 1954, no. 6, Sept., p. 7-8.

Casting techniques and heat treatment of several alloys. Photographs, micrograph. 3 ref.

998* (Blowing of Cast Iron by Oxygen, in Multichamber Receivers.) **Produvka chuguna kislorodom v mnogovannykh kopil'nikakh.** V. A. Fuklev. *Liteinoe Proizvodstvo*, 1954, no. 6, Sept., p. 14-16.

Amount of O used, temperatures of metal before and after blowing; comparison of losses for one- and three-chamber receivers. Diagrams, tables, graphs. 2 ref.

999* (Peculiarities of the Process of Crystallization of Centrifugal Castings.) **Osobennosti protsessa kristallizatsii tsentrobezhnoi otlivki.** A. I. Baikov. *Liteinoe Proizvodstvo*, 1954, no. 6, Sept., p. 20-23.

Mathematical analysis accounting for exact manner of crystallization with different molds and for occurrence of flaws. Diagrams. 4 ref.

1000* (The CO_2 Hardening Process for Molds and Cores.) **Het CO_2-verstijvingsproces voor vormen en kernen.** A. De Jong. *Metalen*, v. 9, no. 18, Sept. 30, 1954, p. 290-292.

Theory, practical method, properties of CO_2 cores, costs, advantages and disadvantages. Tables. 3 ref.

1001* (Production of Silicon Cast Iron.) **Die Herstellung von Siliziumguss.** Paul Holtzhaussen. *Metallurgie und Giessereitechnik*, v. 4, no. 8, Aug. 1954, p. 369-372.

Successful compositions, melting temperatures, and casting methods. Photograph, tables. 2 ref.

1002* (Gravity Die Casting of Light Alloys.) **Le moulage en coquille par gravité des alliages légers.** Henry Garnier. *Revue de l'Aluminium*, v. 31, no. 212, July-Aug. 1954, p. 251-256.

Process and economic aspects of the method, and resultant effects on mechanical properties of the metal. Diagrams, photographs. (To be continued.)

1003* Pearlitic Malleable Iron Stakes Claims to New Jobs for Castings. Carl F. Joseph. *SAE Journal*, v. 62, Oct. 1954, p. 71-74.

Simplicity and adaptability of a casting with the strength and reliability of a forging. Castings are competitive with forgings, stampings, and weldments. Photographs, tables.

See also:
1447 (foundry dust control)

METALS—HEAT TREATMENT

1004 Flame Hardening Now Applied to Bearing Areas of Crankshafts. Herbert Chase. *Automotive Industries*, v. 3, Oct. 15, 1954, p. 48-51.

Techniques and advantages of flame heating and quenching process to increase hardness. Photographs.

Metals—Heat Treatment

1005* 60-Cycle Induction Heating of Steel. C. D. Kramer. *Electrical Engineering*, v. 73, Nov. 1954, p. 1009-1012.

For certain specimen shapes L.F. heating is economical. Graphs, photograph. 4 ref.

1006* Texas-Produced Steel Pipe Normalized by High-Speed In-Line Gas Equipment. James Kniveton. *Gas Journal*, v. 181, Oct. 1, 1954, p. 16-17, 42.

Description of normalizing line and operating procedures. Photographs, diagrams, micrographs, table.

1007 Cold Treatment Improves Accuracy, Life of V-Blocks. Bruno Sainati. *Iron Age*, v. 174, Oct. 14, 1954, p. 136-137.

Treatment of gages made from carburized low alloy steel. Photographs, micrographs.

1008 Improved Quench Methods Developed for Austempering, Martempering. Q. D. Mehrkam. *Iron Age*, v. 174, Oct. 28, 1954, p. 99-102.

Equipment, techniques, and controls to improve properties of treated parts. Graphs, diagrams, photograph.

1009 Influence of Boron on Hardenability of Steel. J. C. Fisher. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Oct. 1954, p. 1146-1147.

Model for describing action of B. 6 ref.

1010* Induction Hardening Practice and Eqiupment. *Mechanical World and Engineering Record*, v. 134, Oct. 1954, p. 452-455.

An outline of the principles and practice of the technique and considerations for wider applications. Photographs.

1011 End-Quench Experiments With Aluminium Bronze. A. R. Bailey and H. C. Skevington. *Metal Industry*, v. 85, Oct. 1, 1954, p. 285-288.

Effects of rapid cooling on structures and mechanical properties. Tables, graphs, micrographs. 5 ref.

1012 Strategic Use of Outside Heat Treating Facilities Can Cut Costs. Ernest M. Olson. *Metal Treating*, v. 5, Sept.-Oct. 1954, p. 2-3, 30.

Factors determining when to farm out work or to purchase special equipment. Photographs.

1013 Heat Treating Aluminum 'Superalloys'. Thomas A. Dickinson. *Metal Treating*, v. 5, Sept.-Oct. 1954, p. 10-11, 40.

Precautions and techniques in cleaning and heat treating of 75S Al alloys. Photographs, tables.

1014 Annealing for Optimum Machinability. H. C. Thomas. *Metal Treatment and Drop Forging*, v 21, Sept. 1954, p. 403-406.

Discussion of the heat treatment of low alloy carburizing steels of SAE 4620 type and the results of machining tests. Micrographs, graphs.

1015* (Oxyacetylene Stress Relief in Large Welded Constructions in Ship and Container Building.) **Autogenes Entspannen geschweisster Grosskonstruktionen im Schiff- und Behälterbau.** H. Kunz. *Schweissen und Schneiden*, v. 6, no. 8, Aug. 1954, p. 328-340.

Techniques and equipment. Table, graphs, diagrams, photographs. 15 ref.

1016* (Quenching and Reheating of Steel Strip After Heating in the Continuous Furnace and After Direct Electric Resistance Heating.) **Bandstahlvergütung nach Erhitzung im Durchziehofen und nach unmittelbarer elektrischer Widerstandserhitzung.** Hermann Stromberg and Anton Pump. *Stahl und Eisen*, v. 74, no. 21, Oct. 7, 1954, p. 1343-1358.

Equipment and techniques for tempering C steel strip. Mechanical properties produced by various treatments. Diagrams, graphs, tables, micrographs. 20 ref.

1017 Induction Heat Treating. Selectivity Teams Up With Versatility. *Steel*, v. 135, Oct. 18, 1954, p. 92-95.

Advantages for hardening, tempering, or stress relieving parts in production lines. Photographs.

1018* ("Quetten"—Hardening Machines for Sheet Metals and Rolled Shapes.) **"Quetten"—Hartemaschinen für Bleche und Walzprofile.** H. Bühler. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 25, Sept. 1, 1954, p. 839-841.

To prevent warping from hardening, the steel sheets or parts are squeezed between two grates during the quenching process. Several types are described and illustrated. Photographs, diagrams.

1019* Gas Carburizing. Its Application to Design. F. H. Conaty. *Western Machinery and Steel World*, v. 45, Oct. 1954, p. 110-114.

Basic principles, typical microstructures, processing techniques, design considerations. Micrographs, drawings, graphs, photographs. 6 ref.

1020 Continuous Patenting, Cleaning, and Coating. Donald K. White. *Wire and Wire Products*, v. 29, Oct. 1954, p. 1131-1140, 1248-1250.

Equipment and treatments for large scale production of steel wire. Flow sheets, photographs, diagrams, table.

See also:
1548 (heat treatment of welded stainless steel)

METALS—MECHANICAL AND PHYSICAL PROPERTIES

1021 The Plastic Deformation of a Crystal in a Polycrystalline Aggregate. (English.) W. Boas and G. J. Ogilvie. *Acta Metallurgica*, v. 2, no. 5, Sept. 1954, p. 655-659.

Microscopic study shows that both interior and surface grains are deformed inhomogeneously. Data are related to current theories. Micrographs. 18 ref.

1022 Formation Energies of Vacancies in Copper and Gold. (English.) C. J. Meechan and R. R. Eggleston. *Acta Metallurgica*, v. 2, no. 5, Sept. 1954, p. 680-683.

Experimental data for temperatures up to 950 C give values of 0.90 e.v. for Cu and 0.67 e.v. for Au. Tables, graphs. 14 ref.

1023 The Dependence of the Thermal Vibration of the Cl-Ion in NaCl, KCl, and RbCl Crystals on the Crystallographic Directions. (English.) U. Korhonen. *Acta Metallurgica*, v. 2, no. 5, Sept. 1954, p. 713-717.

Possibility of measuring the anharmonic part of thermal vibration by X-rays. Tables, graph. 5 ref.

1024 Elastic Properties of Iron Whiskers. (English.) G. W. Sears, A. Gatti, and R. L. Fullman. *Acta Metallurgica*, v. 2, no. 5, Sept. 1954, p. 727-728.

Unusual strength demonstrates a near-perfect crystalline structure. Micrographs. 8 ref.

1025 Heat Content of Lead From 0 to 900°, and the Heat of Fusion. Thomas B. Douglas and James L. Dever. *American Chemical Society, Journal*, v. 76, Oct. 5, 1954, p. 4824-4826.

Compared with earlier studies. Tables, graph. 18 ref.

1026* Minimum Life in Fatigue. A. M. Freudenthal and E. J. Gumbel. *American Statistical Association, Journal*, v. 49, no. 267, Sept. 1954, p. 575-597.

Statistical study of probability of a specimen surviving a certain number of repetitions of a specified stress-cycle in a given testing procedure. Graphs, tables. 7 ref.

1027 Stress-Rupture Properties of Some Chromium-Nickel Stainless-Steel Weld Deposits. R. D. Wylie, C. L. Corey, and W. E. Leyda. *ASME, Transactions*, v. 76, Oct. 1954, p. 1093-1104; disc., p. 1104-1106.

Includes tables, diagrams, graphs, micrographs. 9 ref.

1028 Hardness of Gamma Solid Solution in the Iron-Carbon System at High Temperature. K. A. Osipov and E.

M. Miroshkina. *Henry Brutcher, Altadena, Calif., Translation, no.* 3332, 5 p. (From *Doklady Akademii Nauk SSSR*, v. 94, no. 6, 1954, p. 1065-1067.)

Previously abstracted from original. See item 11560, v. 3, Aug. 1954.

1029 Improvement of Surface Finish of Ground Work Pieces by Electrolytic Polishing and Relationship Between Surface Finish & Mechanical Properties. J. Heyes. *Henry Brutcher, Altadena, Calif., Translation no.* 3335, 9 p. (From *Metalloberfläche*, v. 3, no. 12, 1951, p. B177-B179.)

Study of fatigue strength of steel parts electropolished as against mechanically polished, based on tests of crankshafts treated in an acetic-perchloric acid electrolyte. Particulars on polishing conditions and procedure. Tables, photographs. 5 ref.

1030 Hardness of Martensite as Function of Its Carbon Content. M. Sagisman. *Henry Brutcher, Altadena, Calif., Translation no.* 3365, 5 p. (From *Archiv für das Eisenhüttenwesen*, v. 25, nos. 5-6, 1954, p. 271-272.)

Previously abstracted from original. See item 14558, v. 3, Oct. 1954.

1031 On the Formation of Hot Tears. V. G. Lyuttsau. *Henry Brutcher, Altadena, Calif., Translation no.* 3374, 7 p. (From *Liteinoe Proizvodstvo*, p. 5, no. 2, 1954, p. 16-18.)

Origin and development of hot tears and their relation to alloy composition. Significance of temperature and crystallization range on hot tear susceptibility. Tables, micrographs, diagrams, graphs. 2 ref.

1032 Liquid Metals. I. The Surface Tension of Liquid Sodium: the Vertical-Plate Technique. C. C. Addison, D. H. Kerridge, and J. Lewis. *Chemical Society, Journal*, 1954, Aug., p. 2861-2866.

Liquid Na in A atmosphere wetted Zn between 100 and 200 C. Copper and Mo were not wetted. Diagrams, tables, graphs. 10 ref.

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Use of Geiger counter to measure X-ray diffraction of plastically deformed AISI 52100 steel. Photographs, diagrams, tables.

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Theoretical basis, procedure, and applications. Photograph, charts.

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Theoretical analysis of relations between longitudinal and transverse magnetostriction. Graphs. 8 ref.

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Theoretical and mathematical relations. Table. 7 ref.

10401* (Onset of Flow During Torsion of Metallic Crystals.) **O nastuplenii tekuchesti pri kruchenii metallicheskikh kristallov.** P. I. Kuleshov. *Doklady Akademii Nauk SSSR*, v. 97, no. 6, Aug. 21, 1954, p. 1015-1018.

Creep limit and slip equations of cubic and hexagonal crystals. Table, graphs. 2 ref.

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Equations expressing relations of uneven effects to magnetic field and intensity of magnetization of monocrystals and polycrystals. Graphs. 6 ref.

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Magnetic materials include Imperial permanent magnet steel 6% W, Hymax Co magnet steels, and Nial Ni-Fe-Al magnet alloys. Photographs, graph. (To be continued.)

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Relationships of graphite content and Brinell hardness to other mechanical properties of gray cast iron. Photographs, drawings, charts, micrographs. 5 ref.

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Metals—Mechanical and Physical Properties

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A numerical table permits easy calculation of the Debye characteristic temperature of any cubic metallic element at zero K. Tables. 5 ref.

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Derivation of equation for values of relative heat content, heat capacity, and relative entropy. Tables, graph. 3 ref.

1055* (Effect of Surface Defects Upon Fatique Strength of Crankshafts Made of Magnesium Cast Iron.) **Vliianie poverkhnostnykh defektov na ustalostnuiu prochnost' kolenchatykh valov iz magnievogo chuguna.** I. V. Kudriavtsev and N. A. Balabanov. *Liteinoe Proizvodstvo*, 1954, no. 6, Sept., p. 18-20.

Endurance limits of pearlitic and ferritic Mg cast irons and one steel compared for roll-burnished and unburnished crankshafts. Other mechanical properties. Diagrams, graph, tables. 6 ref.

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Heavy deposit of Rh gave extreme differences in hardness between deposit and base metal; penetration of diamond is limited for accuracy to less than 1/10 of deposit thickness. Graphs, micrograph, diagram. 9 ref.

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Bending fatigue of solid spar booms was superior, probably due to superiority of unclad material. Photographs, micrographs, tables, graphs, diagrams. 2 ref.

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NACA rivets were superior to snap and countersunk V rivets at high loads. Thickness had no effect except at high loads with NACA rivets. Tables, graphs, diagrams. 1 ref.

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Discussion of the value of hot molds. Photographs.

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Table simplifies selection of most economical shape for a given application. Tables, diagram.

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New gages for measurements at high temperatures without compensating circuits. Circuits, graphs. 2 ref.

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1084 An Experimental and Theoretical Investigation of the Anisotropy of 3S Aluminum-Alloy Sheet in the Plastic Range. Arthur J. McEvily, Jr. and Philip J. Hughes. *U.S. National Advisory Committee for Aeronautics, Technical Note* 3248, Oct. 1954, 45 p. (TL570 Un3t)

Tension, compression, and X-ray test data show anisotropy and preferred orientation. Theoretical analysis was checked by data on Cu. Tables, micrographs, drawings, photograph, graphs. 12 ref.

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1086* (Fatigue Strength of Steel Surface-Hardened by High-Frequency Heating by Mechanical and Tube Generators.) **Ustalostnaia prochnost' stali, poverkhnostno zakalennoi pri vysokochastotnom nagreve na mashinnom i lampovom generatorakh.** P. A. Lankin. *Vestnik Mashinostroeniia*, v. 34, no. 8, Aug. 1954, p. 53-55.

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Hydrostatic compression gives greatest improvement; significant

Metals—Mechanical and Physical Properties

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Stress analysis on experimental frameworks and on existing buildings. Behavior of various joints and beam constructions.

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Details of test methods and testing equipment. Interpretation of test data.

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Structural changes are caused by deformation but do not influence creep rate. Intercrystalline fissures may be cause of increased strain rate. Graphs, micrographs, diffraction patterns. 11 ref.

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Effects of small amounts of N, notches, recrystallization, and temperature. Tables, photograph, diagram, reflection patterns, micrographs, graph. 26 ref.

See also:

7 (cumulative creep hypothesis)
473 (contact materials)
782 (strength of weld deposits)
1011 (mechanical properties of Al-bronze)
1016 (mechanical properties of steel strip)
1118 (residual stresses in pressings)
1156 (internal friction of solid solution alloys)
1202 (cold-worked structures)
1285 (electron kinetics in metals)
1380 (theoretical elasticity)
1517 (cracks in 18-8 welds)
1551 (strength of stainless steel welds)

METALS—MECHANICAL WORKING

1105 How Rohr Heats Dies to Form Titanium. J. E. Rheim. *American Machinist*, v. 98, Oct. 11, 1954, p. 161-163.

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Forging; investment casting; milling; turning; broaching; reaming; brazing. Photographs, diagrams. 5 ref.

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1108 Electrospark Machining of Metals. I. S. Bulkin. *Henry Brutcher, Altadena, Calif., Translation no.* 3284, 10 p. (Condensed from *Vestnik Mashinostroeniya*, v. 32, no. 11, 1952, p. 44-49.)

Description of a line of new electrospark machining installations. Photographs, circuit.

1109 Surface Grinding of Rolls by the Electrospark Method. B. M. Gorbunov. *Henry Brutcher, Altadena, Calif., Translation no.* 3310, 13 p. (From *Vestnik Mashinostroeniya*, v. 33, no. 7, 1953, p. 67-70.)

General review of results attainable with electrospark grinding as against abrasive-wheel grinding and specific merits of the electrospark method. Diagrams, photograph, table. 6 ref.

1110* The Grinding of Steel. XIX. Superfinishing. XX. Measurement of Surface Finish. *Edgar Allen News*, v. 33, Sept. 1954, p. 207-208.

Type of abrasive, procedure, and special machinery used in finishing; surface measurement by optical, light, and stylus methods. Photograph. (To be continued.)

1111* The Mechanism of a Simple Drawing Operation. H. W. Swift. *Engineering*, v. 178, Oct. 1, 1954, p. 431-435.

Review of experimental and analytical investigations which have been made into the mechanism of deep-drawing. Graphs, tables, diagram. 10 ref.

1112 Recording of Transient Phenomena in Machine Tools. S. Amari. *Engineers' Digest*, v. 15, Sept. 1954, p. 363-365, 368. (From *Macchine*, v. 9, no. 5, May 1954, p. 467-473.)

New method of point-by-point recording requires little equipment and gives direct recordings on paper. Photographs, diagram.

1113 Some Aspects of Spark Machining. M. G. Seed and H. Drubba. *Engineers' Digest*, v. 15, Sept. 1954, p. 378-380.

Principle; applications; electrical aspects. Graphs, photograph, diagram, circuit.

1114* Effect of Truing Conditions on Circular Grinding. G. Pahlitzsch and J. Appun. *Industrial Diamond Review*, v. 14, Sept. 1954, p. 185-189.

Effect of dressing variables on wheel roughness. Micrographs, diagrams, graph. (To be continued.)

1115 Sendzimir Planetary Hot Mill. John H. Mort. *Iron & Steel*, v. 27, Oct. 1954, p. 486-490.

Application of mathematical formulas for design and operation. Tables, graphs.

1116 Temper Mill Control. George P. Dirth. *Iron and Steel Engineer*, v. 31, Oct. 1954, p. 81-92; disc., p. 92-93.

Regulation of rolling mill speeds. Diagrams, circuits. 3 ref.

1117 Processing and Drawing of Steel Wire. P. A. Beaman. *Iron and Steel Engineer*, v. 31, Oct. 1954, p. 96-100.

Processes and treatments for producing high quality, high strength wire. Photographs.

1118 Elimination of 'Stretcher Strains' in Mild-Steel Pressings. B. B. Hundy. *Iron and Steel Institute, Journal*, v. 178, Oct. 1954, p. 127-138 + 1 plate.

Study of residual stresses developed by temper rolling, roller leveling, and stretching. High macroscopic and microscopic stresses are desirable. Graphs, micrograph, diffraction patterns. 23 ref.

1119* (Deep Drawing Properties of Sheet Steel. Fundamental Principles and Test Method.) **Materials djuppressbarhet. Grundprinciper och provningsmetoder.** Olov Svahn. *Jernkontorets Annaler*, v. 138, no. 9, 1954, p. 573-605; disc., p. 606-610.

Tests were made on 10 grades of steel. Two cup tests appear to closely approximate actual practice. International discussion is invited. Diagrams, graphs, tables, photographs. 49 ref.

1120 Hot Pressing, Press Forming Loom as Answers to Titanium Fabrication. H. W. Dodds and G. F. Davies. *Journal of Metals*, v. 6, Oct. 1954, p. 1116-1118.

New process powders Ti and keeps gaseous and metallic impurities at a minimum. Product now produced by comminuting commercial grade of ductile Ti sponge. Photographs, graphs, table. 4 ref.

1121 Fabrication of Commercially Pure Titanium. Andrew N. Eshman. *Light Metal Age*, v. 12, Oct. 1954, p. 10-11.

Preparation and forming techniques. Photograph.

1122 Successful Fabrication of Titanium Afterburners. F. W. LaMartine. *Light Metal Age*, v. 12, Oct. 1954, p. 14-15.

Special techniques for RC-70 Ti. Photographs.

1123 Air Force Titanium Machinability Report. III. *Light Metal Age*, v. 12, Oct. 1954, p. 22-23.

Test data on drilling, tapping, abrasive cutting, and hacksawing. Table.

1124* How Ryan Forms Titanium. Frank Charity. *Machine and Tool Blue Book*, v. 49, Oct. 1954, p. 228-230, 232.

Commercially-pure Ti is cold or hot formed with bending rolls; punch, brake, and hydraulic presses; and hammer facilities. Photographs.

1125* Fundamental Research of the Superfinish. (English.) Tokio Sasaki and Kenjiro Okamura. *Memoirs of the Faculty of Engineering, Kyoto University*, v. 16, no. 3, July 1954, p. 157-165.

Includes diagrams, table, graphs.

1126* (Belt Grinding or Disk Grinding?) **Bandschleifen oder Scheibeschleifen?** V. G. Pahlitzsch and H. Windisch. *Metalloberfläche*, Ausgabe A, v. 8, no. 9, Sept. 1954, p. 132-141.

Comparison of grinding belts and disks from economic efficiency. Advantages of belts with a multiple layer of grinding material. Diagrams, graphs, table, photographs. 33 ref. (To be continued.)

1127 Skin Milling by Chemical Solution. Manuel C. Sanz. *Metal Progress*, v. 66, Oct. 1954, p. 141-144.

Hot alkaline baths under adequate control can dissolve Al alloys at uniform rates and at such speed as to compete with skin milling. Diagram, photographs, graph.

1128 Relationship Between Drop-Forging Accuracy and Subsequent Machining Operations. K. Lange. *Metal Treatment and Drop Forging*, v. 21, Sept. 1954, p. 407-410, 412.

Influence of material, metal cutting technique, forging design, and clamping technique on the allowances and tolerances made in design and accuracy of a forging for final machining. Diagrams, graphs. 6 ref.

1129* Temperature Field of a Turning Tool and the Reactions in the Zone of Contact. H. Opitz. *Microtecnic (English Ed.)*, v. 8, no. 4, 1954, p. 183-188; disc., p. 189-190.

Temperature zones in cutting tools. Welding of chip to top rake face of tool. Electric potentials developed between tool and workpiece. Diagrams, graphs, circuits.

1130* How to Machine Magnetic Ingot Iron. W. E. McFee. *Modern Machine Shop*, v. 27, Nov. 1954, p. 136-142.

Summary of helpful suggestions based on shop experience. Photographs, tables, diagrams.

1131 Fabricating Characteristics of Stainless Steels. Richard E. Paret. *Product Engineering*, v. 25, Oct. 1954, p. 196-201.

Vital selection factors that distinguish the three basic types of stainless steel according to their adaptability to different fabricating processes. Photographs, tables.

1132 The Mechanism of a Simple Deep-Drawing Operation. H. W. Swift. *Sheet Metal Industries*, v. 31, no. 330, Oct. 1954, p. 817-828.

Review of investigations on drawing cylindrical shells from flat blanks. Diagrams, graphs, tables. 8 ref.

1133 The Forming of Aluminium Sheet. VIII. Hand Forming. H. Hinxman. *Sheet Metal Industries*, v. 31, no. 330, Oct. 1954, p. 837-841.

Covers hollowing, raising, cutting, and filing. Photographs. (To be continued.)

1134* (Comparison of Various Lubricant Carriers Used in Drawing Stainless Steel Wire.) **Vergleich verschiedener Schmiermittelträger beim Ziehen von Drähten aus nichtrostendem Stahl.** Herbert Kuntze and Anton Pomp. *Stahl und Eisen*, v. 74, no. 21, Oct. 7, 1954, p. 1325-1334.

Comparison of cemented carbide die wear and friction values. Micrograph, diagram, tables, photographs, graphs.

1135* (The Effect of Lubricants on the Drawing Load in Steel Bar Drawing.) **Der Einfluss der Schmierstoffe auf die Ziehkraft beim Ziehen von Stabstahl.** Werner Lueg and Karl-Heinz Treptow. *Stahl und Eisen*, v. 74, no. 21, Oct. 7, 1954, p. 1334-1342.

Comparison of physical and chemical charatceristics of natural and synthetic lubricants. Influence of other variables on drawing load. Tables, micrographs, graphs, photographs. 12 ref.

1136* (Geometry of the Working Parts of Dies for Deep Drawing.) **Geometriia rabochikh elementov shtampov dlia**

Metals—Mechanical Working

glubokoi vytiazhki. P. G. Kovtun. *Stanki i Instrument,* v. 25, no. 9, Sept. 1954, p. 21-23.

Defects due to poor quality of metal and to form and dimensions of die parts. Correction formulas. Diagrams, table.

1137 Trends in Modern Forging. Robert G. Friedman. *Steel,* v. 135, Oct. 11, 1954, p. 118-119.

Developments which have permitted forging operations to be included in production lines. Photographs.

1138 How to Drill and Rivet Titanium. Thomas A. Dickinson. *Steel,* v. 135, Oct. 18, 1954, p. 96-97.

Techniques and precautions for safe processing. Table, diagram, photographs.

1139 Applications Increase as Leaded Steels Take Cut at Machining Costs. *Steel,* v. 135, Oct. 25, 1954, p. 159-160, 162.

Increased machinability gained by adding Pb to any steel is leading to rapidly expanding applications. Photographs, table, graph.

1140 Fabrication Study Points to Increased Titanium Applications. W. P. Brotherton. *Steel Processing,* v. 40, Oct. 1954, p. 650 + 6 pages.

Forming, welding, and riveting experience on commercially pure Ti. Photographs.

1141 Gas Vs. Oil Vs. Gas-Oil for Forging. R. J. Reed. *Steel Processing,* v. 40, Oct. 1954, p. 653-660.

Survey failed to show any case in which changes in fuel alone appreciably improved production rate, fuel efficiency, or product quality. Photographs, tables, graphs. 7 ref.

1142* Machinability of Boron-Treated Steels. F. J. Daasch. *Tool Engineer,* v. 33, Nov. 1954, p. 85-88.

Results of tool-life tests for standard steels and their B treated alternates. Table, graphs, micrographs.

1143* (New Information on the Wear of Cutters in the Milling of Structural Steel.) **Neue Erkenntnisse über den Verschleiss der Werkzeuge beim Fräsen von Baustahl.** H. Opitz and K. H. Fröhlich. *VDI Zeitschrift des Vereines deutscher Ingenieure,* v. 96, no. 25, Sept. 1, 1954, p. 822-830.

Effect of initial cutter-to-steel contact, machining conditions, and type of wear; instruments for measuring and recording photographically and graphically cutter wear, force and temperature of cutting, and vibrations. Table, dagrams, graphs, photographs, micrographs. 12 ref.

1144* (Research on the Spring-Back of Presses. Measuring Cutting Force, Spring-Back, and Cutting-Die Path.) **Untersuchung der Auffederung von Pressen. Messung von Schnittkraft, Auffederung und Schnittstempelweg.** H. H. Emschermann and H. Peter. *VDI Zeitschrift des Vereines deutscher Ingenieure,* v. 96, no. 25, Sept. 1, 1954, p. 831-834.

Study of factors affecting the efficiency of punch-press dies, including choice of type of press and die design. Diagrams, photographs, graphs.

1145* (Efficient Cutting of Holes in Austenitic Steel by Countersinks.) **Ratsional'naia obrabotka otverstii v austenitnoi stali zenkerami.** G. S. Andreev. *Vestnik Mashinostroeniia,* v. 34, no. 8, Aug. 1954, p. 31-34.

Criteria for effective cutting; feed, speed, angle, and etc. Effect of previous heat treatment of steel. Graphs, diagram, table. 2 ref.

1146* (Rapid Heating of Steel in Automatic Gas Furnaces.) **Skorostnoi nagrev stali v gazovykh pechakhavtomatakh.** V. F. Kopytov. *Vestnik Mashinostroeniia,* v. 34, no. 8, Aug. 1954, p. 50-51.

Describes furnace types, comparing advantages. Uses include heating and feeding blanks into presses. Diagrams, graph. 1 ref.

1147* Precision Flame Cutting Is Cost-Saving Method for Short Run Production Parts. Max Pearlman. *Western Metals,* v. 12, Oct. 1954, p. 50-52.

Unique equipment offers short cuts on variety of shapes and sizes of steel plate. Photographs.

1148 The Effects of Coiling Temperature on Hot Rolled Rod. R. A. Stebbins. *Wire and Wire Products,* v. 29, Oct. 1954, p. 1141-1142, 1247.

Substantial savings were obtained by coiling C-1008 steel rod at 1450 F instead of 1750 or 1950 F. Table, graphs.

1149 Cooling of Steel Wire During Continuous Drawing. Norman A. Wilson. *Wire and Wire Products,* v. 29, Oct. 1954, p. 1160-1163, 1166-1169, 1253.

Improved air-cooling facilities permit higher drawing speeds. Photographs, graphs, diagrams, table. 7 ref.

Books and Miscellaneous Publications

1150 The Closed Die Process. P. E. Kyle. 140 p. 1954. The MacMillan Company, New York. (TS225 K98c)

Essential steps in producing drop forgings and fundamentals of hot working.

1151 Forming of Austenitic Chromium-Nickel Stainless Steels. 2nd Ed. 394 p. 1954. International Nickel Company, Inc., New York. (TS320 In8f2)

Mechanical properties, forming characteristics, processing after forming, and details of various forming operations.

See also:
147 (ceramics for cutting tools)
528 (electronic control of metalworking machines)
1014 (machinability of alloy steels)
1524 (grinding of carbide tools)

METALS—METALLOGRAPHY, TRANSFORMATIONS, AND STRUCTURES

1152 Inclusions in Iron Crystals Obtained by Recrystallization. (English.) T. Smith. *Acta Metallurgica,* v. 2, no. 5, Sept. 1954, p. 647-654.

Small Fe crystals included in large grains were usually exact twins of the large grain. Graphs, table, Laue photographs, diagrams. 17 ref .

1153 On Self-Diffusion in Cubic Metals. (English.) F. S. Buffington and Morris Cohen. *Acta Metallurgica,* v. 2, no. 5, Sept. 1954, p. 660-666.

Theoretical derivation of constants relating self-diffusion to temperature. Tables. 30 ref.

1154 The Nitrides and Oxide-Nitrides of Tungsten. (English.) R. Kiessling and L. Peterson. *Acta Metallurgica,* v. 2, no. 5, Sept. 1954, p. 675-679.

Structures were determined by chemical and X-ray methods. Tables. 9 ref.

1155 Electron Configurations in Some Transition Metal Alloys. (English.) W. H. Taylor. *Acta Metallurgica,* v. 2, no. 5, Sept. 1954, p. 684-695.

Review of structural data for Al-rich alloys of Cr, Mn, Fe, Co, and Ni indicates some of the important lines for future development. Tables. 20 ref.

1156 Relaxation Effects in Solid Solutions Arising From Changes in Local Order. I. Experimental. (English.) B. G. Childs and A. D. Le Claire. *Acta Metallurgica,* v. 2, no. 5, Sept. 1954, p. 718-726.

Short-range ordering in relation to internal friction and relaxation properties of Cu-Zn, Cu-Al, and Pt-Ni solid solution alloys. Graphs, tables. 12 ref.

1157 Effect of Certain Elements on the Graphitization of Steel. R. J. Fiorentino, A. M. Hall, and J. H. Jackson. *ASME, Transactions,* v. 76, Oct. 1954, p. 1123-1129; disc., p. 1129-1130.

Graphitization process proceeds by means of a nucleation and growth mechanism, and a time rate of nucleation may possibly be involved. Tables, graphs. 16 ref.

1158 Structural Transformations During the Aging of Aluminum-Copper-Magnesium Alloys. Yu. A. Bagaryatskii. *Henry Brutcher, Altadena, Calif., Translation no.* 2701, 9 p.

(From *Zhurnal Tekhnicheskoi Fiziki*, v. 20, no. 4, 1950, p. 424-427.)

Results of X-ray analysis of single crystals of alloys after quenching, and natural and artificial aging. Diagrams. 7 ref.

1159 Contribution to the System Molybdenum-Silicon. R. Kieffer and E. Cerwenka. *Henry Brutcher, Altadena, Calif., Translation no.* 2960, 12 p. (From *Zeitschrift für Metallkunde*, v. 43, no. 4, 1952, p. 101-105.)

Previously abstracted from original. See item 8640, v. 1, July 1952.

1160 The Structure of Titanium-Copper and Titanium-Tungsten Alloys. W. Trzebiatowski, J. Berak, J. Niemiec, and T. Romotowski. *Henry Brutcher, Altadena, Calif., Translation no.* 2990, 2 p. (From *Roczniki Chemii*, v. 25, no. 4, 1951, p. 516-517.)

Results of an investigation based on microscopic and X-ray studies. 4 ref.

1161 Diffusion of Cobalt, Chromium, and Tungsten in Iron and Steel. P. L. Gruzin. *Henry Brutcher, Altadena, Calif., Translation no.* 3331, 8 p. (From *Doklady Akademii Nauk SSSR*, v. 94, no. 4, 1954, p. 681-684.)

Previously abstracted from original. See item 11677, v. 3, Aug. 1954.

1162 Crystallographic Relationship in the Transformation of Iron. H. Neerfeld. *Henry Brutcher, Altadena, Calif., Translation no.* 3341, 12 p. (From *Archiv für das Eisenhüttenwesen*, v. 23, nos. 11-12, 1952, p. 471-473.)

Previously abstracted from original. See item 3027, v. 2, Apr. 1953.

1163 Effect of Nitrogen Upon Surface Tension and Crystallization of Austenitic Steels. N. S. Kreshchanovskii, V. I. Prosvirin, and R. P. Zaletaeva. *Henry Brutcher, Altadena, Calif., Translation no.* 3372, 6 p. (From *Liteinoe Proizvodstvo*, v. 5, no. 1, 1954, p. 23-24.)

Previously abstracted from original. See item 8502, v. 3, June 1954.

1164 Structure and Homogeneity Boundaries of Tantalum Carbide. V. I. Smirnova and B. F. Ormont. *Henry Brutcher, Altadena, Calif., Translation no.* 3376, 9 p. (From *Doklady Akademii Nauk SSSR*, v. 94, no. 3, 1954, p. 557-560.)

Previously abstracted from original. See item 14754, v. 3, Oct. 1954.

1165 Reversibility of Martensite Transformations During the Heating of Iron-Carbon Alloys. V. N. Gridnev and V. I. Trefilov. *Henry Brutcher, Altadena, Calif., Translation no.* 3385, 6 p. (From *Doklady Akademii Nauk SSSR*, v. 96, no. 4, 1954, p. 741-743.)

Previously abstracted from original. See item 14756, v. 3, Oct. 1954.

1166 Interpreting Graphitization for Power Engineers. Helmut Thielsch. *Combustion*, v. 26, Oct. 1954, p. 49-55.

Method presented for evaluating severity of graphitization; recommendations and techniques for rehabilitation. Micrographs, photographs, diagrams.

1167 (Formation of Graphite on the Surface of Steel During Heat Treatment Under Vacuum.) **Obrazovanie grafita na poverkhnosti stali pri termoobrabotke v vakuume.** E. Z. Graifer and I. V. Salli. *Doklady Akademii Nauk SSSR*, v. 97, no. 4, Aug. 1, 1954, p. 663-665.

Importance of Si as an alloying element in graphitization of steels and wrought irons. Micrographs, graph. 5 ref.

1168* (Dilatometric Investigation of the Zeta Phase of the Iron-Silicon System.) **Dilatometricheskoe issledovanie ζ-fazy system zhelezo-kremnii.** P. V. Gel'd and N. N. Serebrennikov. *Doklady Akademii Nauk SSSR*, v. 97, no. 5, Aug. 11, 1954, p. 827-830.

Thermal expansion curves for specimens between 0 and 1000 C. Graphs. 4 ref.

1169* (Structure of Ingot Molds in Steel Plants.) **La structure des lingotières d'aciérie.** Michel Ferry. *Fonderie*, 1954, no. 103, Aug., p. 4070-4077.

Study of variation of quantities of pearlite and ferrite in cast iron molds at various locations in the mold. Micrographs, tables, drawings.

1170* (On the "Nuclei" of Spheroidal Graphite.) **Sur les "Germes" du graphite sphéroïdal.** Adalbert Wittmoser. *Fonderie*, 1954, no. 104, Sept., p. 4128-4145; disc., p. 4146.

Literature review and experimental observations on existence of "nuclei". Micrographs, tables, diagrams, charts. 64 ref.

1171* (Radiographic Investigations on Graphites From Iron-Carbon Alloys.) **Röntgenographische Untersuchungen an Graphiten aus Eisen-Kohlenstoff-Legierungen.** Wolfgang Cruhl and Ernst-Günter Nickel. *Giesserei*, v. 41, no. 18, Sept. 2, 1954, p. 453-456.

Investigations with a counting tube goniometer. Characteristics of differences and their interpretation. Diagrams, tables, micrographs. 7 ref.

1172 Physical Chemistry of Steel. I. Theoretical Bases. J. A. Kitchener. *Iron & Steel*, v. 27, Oct. 1954, p. 473-478.

Thermodynamics and structure of solutions in liquid iron during the process of steel making. Graphs. 4 ref. (To be continued.)

1173 Subcritical Decomposition of Carbide Phase in Some Low-Carbon Silicon Steels. E. D. Harry. *Iron and Steel Institute, Journal*, v. 178, Oct. 1954, p. 109-112.

Graphitization tests on three carbon steels with 1.8, 2.3, and 3.4% Si. Effects of cold rolling, annealing atmosphere, specimen size, and nature of surface. Tables. 11 ref.

1174* (Experiences With Electron Microscopy at the Institute for Metal Research, Stockholm.) **Elektronmikroskopiska erfarenheter vid Metallografiska institutet.** S. Modin. *Jernkontorets Annaler*, v. 138, no. 8, 1954, p. 479-490.

Description of the electron microscope and its properties, replica technique, polishing and etching steel specimens, and examples of replica pictures and their evaluation. Micrographs.

1175* (A Polishing Machine for Micro Specimens.) **En apparat för mekanisk polering av mikroprov.** Lars Ekbom. *Jernkontorets Annaler*, v. 138, no. 8, 1954, p. 490-494.

New device for polishing hard and soft metallographic specimens eliminates the undesirable features of the usual polisher. Diagrams, photograph, micrographs. 3 ref.

1176 Spurious Areas in Pole Figures. A. H. Geisler. *Journal of Applied Physics*, v. 25, Oct. 1954, p. 1245-1249.

Application of X-ray diffraction spectrogoniometer. Graphs, diagrams, tables, diffraction patterns. 3 ref.

1177 Phase Transformations in Titanium-Rich Alloys of Iron and Titanium. D. H. Polonis and J. Gordon Parr. *Journal of Metals*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 200, Oct. 1954, p. 1148-1154.

High purity alloys of Ti and Fe, made by a technique of levitation melting, have been investigated with particular reference to martensite formation and decomposition in the hypoeutectoid range. Photographs, graphs, micrographs. 15 ref.

1178 Delta Ferrite-Austenite Reactions and the Formation of Carbide, Sigma, and Chi Phases in 18 Chromium-8 Nickel-3.5 Molybdenum Steels. H. C. Vacher and C. J. Bechtoldt. *Journal of Research, National Bureau of Standards*, v. 35, Aug. 1954, p. 67-76.

A metallographic study of the effects of chemical composition. Tables, micrographs, X-ray diffraction patterns, graph. 7 ref.

1179* (The So-Called "Direct Decomposition" of Cementite.) **O tak nazyvaemom "priamom raspade" tsementita.** K. P. Bunin. *Liteinoe Proizvodstvo*, 1954, no. 6, Sept., p. 23-26.

Microstructure shows forms in which graphitic inclusions appear, following various heat treatments. Micrographs, diagram. 17 ref.

Metals—Metallography, Transformations, and Structures

1180* (Gas Release and Gas Permeability of Metals Used for Vacuum Tanks.) **Gasabgabe und Gasdurchlässigkeit metallischer Vakuumbaustoffe.** E. Waldschmidt. *Metall*, v. 8, nos. 19-20, Oct. 1954, p. 749-758.

Saturation pressure of different substances as a function of temperature, gas adsorption, and getter effect, solubility and diffusion of gases in metals, and permeability of at. and molecular gases. Graphs, tables. 57 ref.

1181 The Austenite-Martensite Transformation. T. Ko. *Metallurgia*, v. 50, no. 299, Sept. 1954, p. 122-124.

Survey of work at Birmingham University from 1947-1953. 12 ref.

1182* (Research With the Electron Microscope on the Structure of Copper Electrodeposited From a Solution of Fluoborate.) **Ricerche con il microscopio elettronico sulla struttura del rame elettrodeposto da soluzioni di fluoborato.** G. Bianchi. *Metallurgia italiana*, v. 46, nos. 7-8, July-Aug. 1954, p. 251-256.

Effects of current density on crystalline shapes. Diagrams, micrographs. 7 ref.

1183* (Etch-Printing Process for Phosphorus and for Distinguishing Gray From White Zones in Mottled Cast Iron by the Structure-Developing Method With Sodium Thiosulfate.) **Ätzabdruckverfahren auf Phosphor und zur Unterscheidung von grau und weiss erstarrten Zonen in melierten Gusseisen mach der Gefügeentwicklung mit Natriumthiosulfat.** I. Heinz Klemm. *Metallurgie und Giessereitechnik*, v. 4, no. 8, Aug. 1954, p. 362-365, 360.

Methods of depicting phosphide segregations and the distribution of gray and white zones in cast iron. Photographs, micrographs. 21 ref.

1184* (Contribution to the Problem of Diffusion in Columnar Grains in Steel.) **Beitrag zum Problem des Diffusionsstengelkorns in Stahl.** Hermann Schumann. *Metallurgie und Giessereitechnik*, v. 4, no. 8, Aug. 1954, p. 366-367, 359.

Columnar structure is shown to have a harmful effect on the adherence of nitride layers due to tensile stresses caused by the greater specific vol. of the Fe_4N segregated in grain boundaries parallel to the surface. Photograph, micrographs. 4 ref.

1185* (Lattice Defects in Ionic Crystals.) **Difetti reticolari nei solidi ionici.** F. G. Fumi. *Nuovo cimento (Supplemento)*, v. 12, ser. 9, no. 1, 1954, p. 67-76.

Types and origin of defects. Diagrams. 2 ref.

1186* (Diffusion and Its Role in Casting.) **A diffúzió és öntészeti vonatkozásai.** János Prohászka. *Öntöde*, v. 5, no. 8, Aug. 1954, p. 174-180.

Mechanism of diffusion. Carbon and gas diffusion in iron castings. Diffusion and tempering. Diagrams, graphs, photographs, table. 10 ref.

1187* Electron Diffraction Study on the Ordered Alloy CuAu. (English.) Shiro Ogawa and Denjiro Watanabe. *Physical Society of Japan, Journal*, v. 9, no. 4, July-Aug. 1954, p. 475-488.

Shows that two phases coexist in the ordered state for alloys in the 1:1 region of composition. Diffraction patterns, diagrams, table, graph. 24 ref.

1188* Order-Disorder Transitions in A_2BC Ternary Alloys With the Plane Square or the Body-Centered Cubic Lattice. (English.) Sukeaki Hosoya. *Physical Society of Japan, Journal*, v. 9, no. 4, July-Aug. 1954, p. 489-495.

Calculations show four types of ordered states can appear. Factors which determine type appearing. Graphs, diagrams, tables. 8 ref.

1189* Study on the Crystallization Process of Polished Layers of Metals by Electron Diffraction and Microscopy. (English.) Kōzō Nonaka and Kazutake Kohra. *Physical Society of Japan, Journal*, v. 9, no. 4, July-Aug. 1954, p. 512-520.

Crystal growth of Beilby layers of Cu, Ni, and Au at various temperatures. Diagrams, diffraction patterns, tables, graphs, micrographs. 20 ref.

1190 The Lattice Spacing of Binary Tin-Rich Alloys. J. A. Lee and G. V. Raynor. *Physical Society, Proceedings*, v. 67, no. 418B, Oct. 1954, p. 737-747.

Variation of structures with composition of solid solutions in Sn of Sb, Bi, Pb, In, Cd, Zn, and Hg. Graphs, tables, diagrams. 12 ref.

1191* (Structures of Chilled Iron Rolls.) **Struktury walców utwardzonych.** J. Jastrzebska and W. Haczewski. *Prace Instytutów Ministerstwa Hutnictwa*, v. 6, no. 4, 1954, p. 157-169.

Optimum microstructures were established for core and chilled layers for working conditions prevailing in Polish and German rolling practice. Tables, micrographs, graphs, diagram. 14 ref.

1192* (Recrystallization of Uranium After Passing Through the Transformation Points.) **Recristallisation de l'uranium après passage des points de transformation.** M. Pruna, P. Lehr and G. Chaudron. *Revue de métallurgie*, v. 51, no. 9, Sept. 1954, p. 589-596.

Dilatometric and metallographic studies. Table, graphs, micrographs, diffraction patterns. 3 ref.

1193* (Orientation of Crystals in Rolled Uranium.) **Sur l'orientation des cristaux dans l'uranium laminé.** A. Winogradski. *Revue de métallurgie*, v. 51, no. 9, Sept. 1954, p. 597-601; disc., p. 601-602.

X-ray study of very thin sheets. Pole figures, graph, micrograph. 3 ref.

1194* (A Study of the Annealing of Rolled Uranium.) **Étude du recuit de l'uranium laminé.** G. Cabane and J. Petit. *Revue de métallurgie*, v. 51, no. 9, Sept. 1954, p. 603-612; disc., p. 612-613.

Deformation proceeds by both twinning and slip causing differences in annealing behavior. Table, graphs, micrographs, diffraction patterns. 10 ref.

1195* (A Metallographic Study of the β-to-α Transformation of Uranium in Stabilized Uranium-Chromium Alloys.) **Étude métallographique de la transformation β-α de l'uranium dans les alliages stabilisés uranium-chrome.** B. W. Mott and H. R. Haines. *Revue de métallurgie*, v. 51, no. 9, Sept. 1954, p. 614-616.

Mechanisms of transformation at room temperature after quenching from 720 C. Table, micrographs. 4 ref.

1196* (A Metallographic Study of Uranium Hydride Inclusions in Metallic Uranium.) **Étude métallographique des inclusions d'hydrure d'uranium dans l'uranium métallique.** H. Mogard and G. Cabane. *Revue de métallurgie*, v. 51, no. 9, Sept. 1954, p. 617-622.

Data for U-H equilibria were obtained by studying inclusions produced by heating specimens in a high H pressure. Micrographs, graphs. 13 ref.

1197* (Notes on the Solidification and Effervescence of Basic Bessemer Steel Ingots Weighing 4.6 Tons.) **Remarques sur la solidification et l'effervescence de lingots d'acier Thomas pesant 4, 6 T.** J. Duflot and A. Richard. *Revue de métallurgie*, v. 51, no. 9, Sept. 1954, p. 623-655; disc., p. 655-657.

Effects of pouring rate, mold wt, and composition of gasses on solidification and surface quality. Diagrams, tables, graphs, photograph. 33 ref.

1198 A Precision Grinding Machine for Diffusion Studies. Harry Letaw, Jr., Lawrence M. Slifkin, and William M. Portnoy. *Review of Scientific Instruments*, v. 25, Sept. 1954, p. 865-868.

Instrument for problems involving very small diffusion coefficients and radioactive tracers of very short half-life. Suitable for Studying Ge and ductile metals. Diagrams, photograph, table. 1 ref.

1199 Apparatus for X-Ray Diffraction Studies of Metals Under Controlled Stress at Elevated Temperature. L. S. Birks. *Review of Scientific Instruments*, v. 25, Oct. 1954, p. 963-966.

Geiger-counter X-ray spectrometer. Construction details. Photographs, diagrams. 6 ref.

1200 An Electron-Diffraction Examination of Thin Films of Lithium Fluoride and Copper Prepared by Vacuum Evaporation. J. S. Halliday, T. B. Rymer, and K. H. R. Wright. *Royal Society, Proceedings*, v. 225, ser. A, Sept. 22, 1954, p. 548-563.

Effect of stress and specimen texture on the diffraction pattern. Diagrams, graphs, tables. 13 ref.

1201 On the Solution-Body Phenomenon and Anisotropy of Solution Rate in Bismuth Crystals. (English.) Mikio Yamamoto and Jirō Watanabé. *Science Reports of the Research Institutes, Tohoku University*, ser. A, v. 6, no. 3, June 1954, p. 233-243.

Solution rates are more anisotropic in nitric acid than in a nitric-hydrochloric mixture. Graphs, tables, diagrams, photographs. 17 ref.

1202* Study of Cold-Working by Microfocussing X-Ray. I. Fine Structure of Laue Spot. (English.) Tomiya Sutoki and Kôichi Nakajima. *Science Reports of the Research Institutes, Tohoku University*, ser. A, v. 6, no. 3, June 1954, p. 244-252.

With repeated cold working and successive annealing at low temperatures the spot structure of Al single crystals remained lamellar but with high temperatures an irregular, complicated structure developed. Diagrams, photographs. 5 ref.

1203* (Reaction of Silver-Palladium Alloys With Sulfur at Elevated Temperature.) **Über die Reaktion von Silber-Palladium-Legierungen mit Schwefel bei erhöhter Temperatur.** Ernst Raub, Bernhard Wullhorst, and Werner Plate. *Zeitschrift für Metallkunde*, v. 45, no. 9, Sept. 1954, p. 533-537.

Formation of brittle Ag_2Pd_2S and Ag_2S crystals. Photographs, micrographs, constitution diagram, table, interference diagrams. 10 ref.

1204* (Boundary-Layer Investigations on Lead-Tin Alloys.) **Grenzschichtuntersuchungen an Blei - Zinn - Legierungen.** Klaus Detert. *Zeitschrift für Metallkunde*, v. 45, no. 9, Sept. 1954, p. 547-550.

Metallographic and chemical investigation of the phase structure of cast alloys indicates a eutectic surface regardless of Sn concentration and cooling rate. Micrographs, table, graph, diagram. 5 ref.

1205* (Change in Dimensions of Diffusion Specimens.) **Dimensionsänderungen von Diffusionsproben.** Wolfgang Seith and Rudolf Ludwig. *Zeitschrift für Metallkunde*, v. 45, no. 9, Sept. 1954, p. 550-554.

Effect of mutual diffusion of weld-joined metals on their dimensions in longitudinal and transverse direction over an extended span of time. Graphs, diagram, micrographs. 8 ref.

Books and Miscellaneous Publications

1206 The Practical Applications of a System of Metallographic Polishing Using Diamond Abrasives. L. E. Samuels and M. Hatherly. Commonwealth of Australia, Dept. of Supply, Defence Standards Laboratories Report 200, Feb. 1954, 14 p. (T177 A78.2r)

Improved techniques for polishing of ferrous, Al, Mg, and Cu alloys. Micrographs. 12 ref.

See also:

1011 (structure of al-bronze)
1019 (principles of gas carburizing)
1024 (structure of iron whiskers)
1061 (diffusion of H in steel)
1074 (structure of investment castings)
1266 (autoradiographic techniques)

METALS—POWDER

1207 Corrosion-Resistant, Iron-Base Metal Powder Products. N. I. Moskvin. *Henry Brutcher, Altadena, Calif., Translation no.* 2967, 7 p. (From *Vestnik Mashinostroeniya*, v. 32, no. 3, 1952, p. 73-76.)

Production and properties; simultaneous sintering and chromizing of Fe-powder compacts. Tables, graphs, photographs, micrographs, diagrams.

1208 Hot Pressing of Copper Powders. R. Palme. *Henry Brutcher, Altadena, Calif., Translation no.* 3351, 9 p. (From *Metall*, v. 8, nos. 9-10, 1954, p. 369-371.)

Previously abstracted from original. See item 11732, v. 3, Aug. 1954.

1209 Regularities in the Compacting of Copper-Graphite Powders. T. N. Znatokova and V. I. Likhtman. *Henry Brutcher, Altadena, Calif., Translation no.* 3382, 8 p. (From *Doklady Akademii Nauk SSSR*, v. 96, no. 3, 1954, p. 577-580.)

Previously abstracted from original. See item 14804, v. 3, Oct. 1954.

1210 Powder Metallurgy. *Iron Age*, v. 174, Sept. 30, 1954, p. 73 + 25 pages.

Production economies; press design trends; hot coining methods; sintering problems; plating techniques; highdensity parts; part case histories. Photographs, micrographs, graph. 9 ref.

1211 Cemented Carbides: Wear Resistance Uses Grow. F. J. Lennon. *Iron Age*, v. 174, Oct. 14, 1954, p. 142-144.

Cost reduction permits extended applications. Photographs.

1212 Chromium-Nickel Alloy Steel Powders for High Strength Parts. E. Gordon, W. V. Knopp, and J. D. Shaw. *Materials & Methods*, v. 40, Oct. 1954, p. 107-109.

Properties and applications of pre-alloyed Cr-Ni powders when added to low cost reduced Fe powders produce strong and wear resistant products for pressing and sintering. Tables, micrographs. 1 ref.

1213 Powder Metallurgy Takes Its Place in Industry. Robert Talmage. *Mechanical Engineering*, v. 76, Oct. 1954, p. 817-820.

Advantages and savings from rapidly growing methods of producing metal precision parts. Photographs, table.

1214 Sintering Metal Powder Compacts. P. F. Hancock. *Metal Industry*, v. 85, Sept. 17, 1954, p. 225-228.

Processes, equipment, and atmospheres used in powder metallurgy. Photographs, diagram.

1215* (Sintering Advantages and Limitations.) **Sinterizzazione. Vantagii e limitazioni.** Neri Corsini. *Metallurgia italiana*, v. 46, nos. 7-8, July-Aug. 1954; *Atti notizie (AIM)*, v. 9, nos. 7-8, July-Aug. 1954, p. 209-211, 225.

Discusses raw materials, equipment, depreciation, and other processing costs. Table.

1216* (Recent Development of Hard Metals.) **Die neuere Entwicklung der Hartmetalle.** Alfred Merz. *Metallurgie und Giessereitechnik*, v. 4, no. 8, Aug. 1954, p. 342-348, 353.

Review of the structures and properties of the hard components and bonding metals. Recent advances made to increase toughness, hardness, wear resistance, and scaling resistance with and without Co. Tables, diagrams, micrographs, graphs. 35 ref.

1217 Manufacture of Sheet From Metal Powder. W. D. Jones. *Metal Treatment and Drop Forging* v. 21, Sept. 1954, p. 421-424, 430.

Iron and Cu powder metallurgy; rolling; economics; powder flame spraying. Photographs.

1218* (Some Possibilities of Powder Metallurgy in the Field of Aeronautics.) **Quelques possibilités de la métallurgie des poudres dans le domaine de l'aéronautique.** Nguyen Thien-Chi. *Métaux, Corrosion-Industries*, v. 29, nos. 347-348, July-Aug. 1954, p. 269-291.

Use of refractory metals, heavy alloys, Ti, cermets, porous bearings, electric contacts, magnetic materials, and semiconductors. Photographs, tables, charts.

Metals—Powder

1219* (Production of Zirconium Powder by Magnesium-Thermal Method.) **Otrzymywanie proszku cyrkonu metoda magnezotermiczna.** W. Rutkowski. *Prace Instytutów Ministerstwa Hutnictwa,* v. 6, no. 4, 1954, p. 176-183.

Method produces Zr of 92% purity from Zircon. Tables, graphs, diagrams, micrographs. 11 ref.

1220* (Iron Powder for Mass Products Obtained From Mill Scale Reduced by Hydrogen and Carbon.) **Proszek żelaza do wyrobów masowych ze zgorzeliny hutniczej redukowanej wodorem i weglem.** B. Razumowski. *Prace Instytutów Ministerstwa Hutnictwa,* v. 6, no. 4, 1954, p. 188-199.

Use of H resulted in powder of 99% purity; purity was 97 to 98% when the scale was reduced by coal. Tables, micrographs, diagrams, graphs.

1221 Powder Metallurgy. *Precision Metal Molding,* v. 12, Oct. 1954, p. 50-54.

Outline of the process prepared to aid designers and buyers to understand special features of the process. Photographs.

1222 High Strength Steel Parts Produced by a New Powder Metallurgy Process. John W. Young. *Precision Metal Molding,* v. 12, Nov. 1954, p. 48-51, 89-92.

Details of new process, properties of typical parts. Table, graphs, photographs, micrographs.

MINING ENGINEERING

1223* CMC-Base Mud Successful in Solidification Tests. H. R. Till and R. F. Boswell. *Drilling,* v. 15, Oct. 1954, p. 99, 101.

Studies on solidification of drilling and packer muds. Photograph.

1224* Bottom-Hole Chip Clearance Studied. R. Simon and D. M. Gideon. *Drilling Contractor,* v. 10, Oct. 1954, p. p. 97-100.

Drillability of various limestones; chip-clearing action of drilling fluids at the bottom of the hole. Photographs, tables.

1225* Geophysical Methods of Oil Prospecting—A Review. I. Introduction. D. Taylor Smith. *Petroleum,* v. 17, Oct. 1954, p. 362-364, 371.

Gravitational, magnetic, seismic, and electrical methods. Diagrams, graphs. (To be continued.)

1226* What's New Tomorrow? Sim H. Crews. *Petroleum Engineer (Management Edition),* v. 26, Oct. 1954, p. B33-B38.

Forecast of developments in drilling oil wells and petroleum recovery methods and equipment. Photographs.

1227* What Is This Sonic Drill? J. B. Stumm. *Petroleum Engineer (Management Edition),* v. 26, Oct. 1954, p. B52.

Description of new type of percussion rock-drilling equipment which utilizes sonic energy.

1228* Improving Rotary Rig Operations. Wilson J. Bentley. *Petroleum Engineer (Management Edition),* v. 26, Oct. 1954, p. B54, B64, B66.

Methods improvement studies. Tables.

1229 Mechanical Mining in Some Bituminous-Coal Mines. VII. Methods of Mining With Continuous-Mining Machines. J. J. Shields, M. O. Magnuson, W. A. Haley, and J. J. Dowd. *U. S. Bureau of Mines, Information Circular,* 7696, Sept. 1954, 118 p. (TN21 Un3i)

Description of operations in various mines. Tables, diagrams.

1230 Mining With a Dosco Continuous Miner on a Longwall Face. R. W. Stahl and J. J. Dowd. *U. S. Bureau of Mines, Information Circular* 7698, Sept. 1954, 11 p. (TN21 Un3i)

Equipment and operating procedures. Diagrams, photographs.

Books and Miscellaneous Publications

1231 Offshore Summary. Emory N. Kemler and Edward W. Rosencrants. Sections individually paged. 1954. Summary Reports, Spring Park, Minnesota. (TC153 K31o)

Offshore oil well drilling; structures, pipelines, and practices.

1232 Minerals for Atomic Energy. Robert D. Nininger. 367 p. 1954. D. Van Nostrand Company, Inc., New York. (TN270 N62m)

Minerals and deposits; evaluation of various areas of the world; prospecting equipment and procedures; evaluation of prices and markets.

See also:
488 (electrical prospecting)

NONDESTRUCTIVE TESTING

1233* Ultrasonic Testing. Edward F. Weller, Jr. *Aircraft Production,* v. 16, Oct. 1954, p. 422-425.

Resonance, transmission, and frequency modulation methods. Equipment; applications. Photographs, diagram, circuit.

1234 Ultrasonic Testing of Intricately Shaped Parts. E. Martin and K. Werner. *Henry Brutcher, Altadena, Calif., Translation no.* 3291, 20 p. (From *Archiv für das Eisenhüttenwesen,* v. 24, nos. 9-10, 1953, p. 411-422.)

Relationship between path of ultrasonic waves and location and size of defects by the pulse reflection method using oblique incidence of beam. Photographs, diagrams, reflectrograms. 1 ref.

1235 Ultrasonic Transparency of Steel and Its Bearing on the Results Obtained With the Pulse-Reflection Technique. A. Michalski. *Henry Brutcher, Altadena, Calif., Translation no.* 3308, 15 p. (Abridged from *Stahl und Eisen,* v. 74, no. 1, 1954, p. 26-33.)

Previously abstracted from original. See item 7102, v. 3, May 1954.

1236 Probolog—An Application of Eddy Current Techniques to Non-Destructive Testing. William J. Warren. *Corrosion,* v. 10, Oct. 1954, p. 318-323; disc., p. 323.

Principles of eddy current phenomena and their application. Diagrams, graphs, photograph.

1237* A New Machine for Endurance Tests With Stress Cycles of Variable Amplitudes. Hugo K. Leber. *General Motors Engineering Journal,* v. 1, Sept.-Oct. 1954, p. 16-20.

Realistic short-life testing of automobile parts reduces time required to perform endurance tests. Photographs, graphs, diagram.

1238* (Measuring the Intensity of Ultrasonic Waves by Compensation Calorimetry.) **Ultrahang intenzitásmérés kompenzációs kalorimetriával.** János Szilárd. *Magyar Fizikai Folyóirat,* v. 2, no. 3, 1954, p. 165-171.

Method based on the fact that liquid in the calorimeter heats up in relation to the absorbed energy. Diagrams, tables, graphs. 4 ref.

1239 Non-Destructive Testing. C. M. Gilmour. *Metal Industry,* v. 85, Sept. 17, 1954, p. 229.

Sigma-test method unique for given types of testing at all stages of production because of its speed and simplicity of operation. Photograph.

1240* Common Sense Nondestructive Testing. R. C. McMaster. *Nondestructive Testing,* v. 12, Sept.-Oct. 1954, p. 13-17.

Normal use of human senses illustrate basic principles of nondestructive testing. Drawings.

1241* Tools of Inspection. Rebecca H. Sparling. *Nondestructive Testing,* v. 12, Sept.-Oct. 1954, p. 19-28.

Nondestructive tests for indicating quality or soundness of metals. Diagrams.

1242* The Theory of Eddy Current Testing in One (Not-So-Easy) Lesson. Richard Hochschild. *Nondestructive Testing,* v. 12, Sept.-Oct. 1954, p. 31-40.

Theory and applications. Diagram, graphs.

1243* Absorption of Ultrasonic Waves in Organic Liquids. I. Liquids With Positive Temperature Coefficients of Sound Absorption. (English.) Tadaski Kishimoto and Otohiko Nomoto. *Physical Society of Japan, Journal*, v. 9, no. 4, July-Aug. 1954, p. 620-627.

Includes graphs, tables. 9 ref.

1244* Nondestructive Testing of Water-Wheel Generating Unit Mechanical Components. T. C. Stavert. *Power Apparatus and Systems*, 1954, no. 14, Oct., p. 1279-1281; disc., p. 1281-1282.

Includes photographs.

1245 New Method of Determining Ultrasonic Wavelength in Liquid. Nobuyoshi Yamamoto. *Review of Scientific Instruments*, v. 25, Oct. 1954, p. 949-950.

An ultrasonic grating. Diagrams, tables. 3 ref.

1246* Magnetic Comparator Testing of Steel Cartridge Cases. S. S. Rice. *Tooling and Production*, v. 20, Oct. 1954, p. 83 + 5 pages.

Profitable application of nondestructive testing for quality control. Photographs, graphs.

1247 New Isotopes Aid Radiography of Spheres and Tanks. P. J. Stewart. *Welding Engineer*, v. 39, Nov. 1954, p. 40-42.

Nondestructive testing of welded structures. Photographs, graph.

1248 New Concepts in Spot X-Ray of Welded Structures. Harold Hovland. *Welding Journal*, v. 33, Oct. 1954, p. 962-965.

Portable X-ray equipment to replace trepanning inspection of welds. Photographs.

1249* Electronic 'Private Eyes' Guard Against Structural Flaws in Jet Components. A. S. Billings. *Western Metals*, v. 12, Oct. 1954, p. 63-65.

Applications of X-ray metallography, fluorescent and die penetrants, magnetic particle inspection, and spectroscopy. Photographs.

Books and Miscellaneous Publications

1250 Handbook on Radiography. 71 p. 1950. Commercial Products Division, Atomic Energy of Canada, Ltd., Ottawa. (TR750 At71h)

Sources of radiation; fundamentals, equipment, and applications of radiography.

See also:
619 (electronic thickness gage)
629 (vacuum-tube quality selection)
798 (measuring thickness of metallic coatings)

NUCLEAR PHYSICS, NUCLEONICS, AND RADIATION

1251 Tables for Evaluating Bateman Equation Coefficients for Radioactivity Calculations. F. J. Flanagan and F. E. Senftle. *Analytical Chemistry*, v. 26, Oct. 1954, p. 1595-1601.

Tabulates decay constants and their functions. 6 ref.

1252* Recent Developments in Nuclear Physics. John Cockcroft. *Atomics (British)*, v. 5, Oct. 1954, p. 279-285, 294.

Review of developments in particle accelerators and meson experiments. Photographs.

1253* (Shielding Against Radioactive and X-Rays.) **Afscherming van radioactieve- en röntgenstraling.** *Bedrijf en Technick*, v. 9, no. 209; *Electronica section*, v. 7, no. 156, Aug. 28, 1954, p. 141.

Relative effectiveness of different materials as protection against radiation expressed in terms of thickness. Graph.

1254* (Possibilities of Realizing the Atomic-Power Plant of the Future.) **Wege zum Atomkraftwerk der Zukunft.** *Brennstoff-Wärme-Kraft*, v. 6, no. 9, Sept. 1954, p. 358-359.

Review of modern attempts at generating electricity with at. power. Photograph, diagram, table. 7 ref.

1255 Determination of the Absolute Fission Yield of Ba^{140} in Thermal Neutron Fission of U^{235}. L. Yaffe, H. G. Thode, W. F. Merritt, R. C. Hawkings, F. Brown, and Rosalie M. Bartholomew. *Canadian Journal of Chemistry*, v. 32, Nov. 1954, p. 1017-1024.

Found to be (6.32±0.24%). Half-life of La^{140} is 40.31±0.06 hr. 25 ref.

1256* (The Application of Radioisotopes.) **Uber die Anwendung von Radioisotopen.** Hans Götte. *Chemische Industrie*, v. 6, no. 9, Sept. 1954, p. 500-504.

Argues that a German pile would permit valuable extension of studies.

1257* (Artificial Elements.) **Künstliche Elemente. I.** G. Herrmann. *Chemische Technik*, v. 6, no. 9, Sept. 1954, p. 494-502.

Transmutation of elements; study of radioactive and chemical properties of Te, Pm, At, and Fr. Tables. (To be continued.)

1258* (Decay Levels of Np^{237}.) **Sur le schéma da niveaux du ^{237}Np.** John Milsted, Salomon Rosenblum, and Manuel Valadares. *Comptes rendus*, v. 239, no. 12, Sept. 20, 1954, p. 700-702.

Includes diagram. 4 ref.

1259 Direct-Reading Grenz-Ray Dosimeter. H. B. Weisbecker and R. Steinitz. *Electronics*, v. 27, Oct. 1954, p. 168-169.

Portable instrument using ionization chamber and d.c. amplifier measures radiation strength of soft X-rays over ranges of 500, 2,500, and 25,000 r per min. Battery power source permits portable operation for application in X-ray therapy. Diagram, table, circuit, photograph.

1260* (Measuring Sedimentation in Nuclear Emulsions.) **Mesure du facteur d'affaissement des émulsions nucléaires.** M. Gailloud, Ch. Haenny, and R. Weill. *Helvetica Physica Acta*, v. 27, no. 4, Aug. 1954, p. 337-354.

Various emulsions were irradiated and refraction indices were measured. Diagrams, tables, graphs. 21 ref.

1261* Operational Features of Zephyr. J. E. R. Holmes, D. D. McVicar, H. Rose, L. R. Shepherd, R. D. Smith, and A. M. Smith. *Journal of Nuclear Energy*, v. 1, Aug. 1954, p. 47-52.

This small, low-power, fast reactor, at A.E.R.E., Harwell, has a Pu core with movable natural U sections, all in an U enevelope. Table, diagrams, graphs. 2 ref.

1262* The Operation of a Thermal Neutron Time-of-Flight Spectrometer. P. A. Egelstaff. *Journal of Nuclear Energy*, v. 1, Aug. 1954, p. 57-75 + 1 plate.

Description of operation and cross-section measurements. Diagrams, graphs, tables. 5 ref.

1263 Effect of High Velocity Electrons on Dry Dextran. F. P. Price, W. D. Bellamy, and E. J. Lawton. *Journal of Physical Chemistry*, v. 58, Oct. 1954, p. 821-824.

Exposed to 800 kv. cathode rays for possible use as a plasma extender. Tables. 13 ref.

1264 α-Radioactivity of Some Rocks and Common Materials. John B. Ockerman and Farrington Daniels. *Journal of Physical Chemistry*, v. 58, Oct. 1954, p. 920-927.

Almost 300 samples of six different materials are tabulated. 1 ref.

1265* (A New Statistical Atom Model.) **Egy új statisztikus atommodellről.** Pál Gombás. *Magyar Fizikai Folyóirat*, v. 2, nos. 1-2, 1954, p. 63-74.

Suggests some modifications of the Thomas-Fermi model, going beyond the Weizsäcker correction. Table, diagrams. 4 ref.

1266* (On the Autoradiographic Method.) **Zur autoradiographischen Methode.** Georg Rieder. *Naturwissenschaften*, v. 41, no. 18, Sept. 1954, p. 421-422.

Factors which determine the resolving power of autoradiography as a means of determining the diffusion of substances. 2 ref.

Nuclear Physics, Nucleonics, and Radiation

1267 Biological Applications of Tritium. Roy C. Thompson. *Nucleonics*, v. 12, Sept. 1954, p. 31-35.

Properties as H tracer and ionizing-radiation source. Tables. 93 ref.

1268 Trends in Nuclear Instrumentation. Denis Taylor. *Nucleonics*, v. 12, Oct. 1954, p. 12-19.

New, more portable survey meters; novel pulse-height analyzers; scintillation counting; air-monitoring equipment of increased sensitivity; transistor circuitry; reactor instrumentation. Diagrams, graphs, circuits. 11 ref.

1269 How to Test a Nuclear Power Plant. *Nucleonics*, v. 12, Oct. 1954, p. 22-25.

Safety features and test requirements for the Army Package Power Reactor. Photograph.

1270 Isotope Production: How to Choose Irradiation Time. Wm. Bradley Lewis. *Nucleonics*, v. 12, Oct. 1954, p. 30-33.

Rigorous analysis of the general rate equations governing isotope production and decay; uses of Au^{198}, Au^{199}, and Tm^{170}. Graphs, table.

1271 Film Badge Dosimetry: How Much Fading Occurs? William L. McLaughlin and Margarete Ehrlich. *Nucleonics*, v. 12, Oct. 1954, p. 34-36.

Semi-empirical equations relating fading to storage time. Graphs. 12 ref.

1272 Electron Energy Distributions Produced by Gamma-Rays. H. E. Johns, J. E. Till, and D. V. Cormack. *Nucleonics*, v. 12, Oct. 1954, p. 40-46.

Tables for calculating the distribution of secondary-electron energies in γ-ray irradiated materials. Applications to cavity measurements of ionization and to radiological problems. Graphs, tables, diagrams. 14 ref.

1273 Advances in Isotope Techniques. R. A. Faires, J. E. Johnston, and Rosaleen J. Millett. *Nucleonics*, v. 12, Oct. 1954, p. 48-51.

New applications of radioisotopes to medical therapy and diagnosis, animal physiology and pathology, plant nutrition, biochemistry, chemistry, physics, and to industrial research and control.

1274* (Heavy Neutral Particles.) **Particelle pesanti neutre.** M. Conversi. *Nuovo cimento (Supplemento)*, v. 12, ser. 9, no. 1, 1954, p. 35-55 + 3 plates.

Review of recent research in Italy. Photographs, diagrams, graphs. 90 ref.

1275 The Producton of Radio-Isotopes. A. H. W. Aten and J. Halberstadt. *Philips Technical Review*, v. 16, July 1954, p. 1-12.

Production of isotopes by the Philips synchrocyclotron at Amsterdam. Tables, diagrams, photograph.

1276* The Transport Properties and Equation of State of Gaseous Mixtures of the Helium Isotopes. (English.) E. G. D. Cohen, M. J. Offerhaus, and J. De Boer. *Physica*, v. 20, no. 8, Aug. 1954, p. 501-515.

On the basis of the 12-6-Lennard-Jones potential field, a quantum mechanical calculation was made of the properties of gaseous mixtures of ^{3}He and ^{4}He. Tables, graphs. 11 ref.

1277* Nuclear Levels in ^{60}Ni From the Decay of ^{60}Cu. (English.) R. H. Nussbaum, R. Van Lieshout, A. H. Wapstra, N. F. Verster, F. E. L. Ten Haaf, G. J. Nijgh, and L. Th. M. Ornstein. *Physica*, v. 20, no. 8, Aug. 1954, p. 555-570.

Radiations from ^{60}Cu were investigated by means of a single channel NaI-scintillation spectrometer and a magnetic lens type β-ray spectrometer. Diagrams, graphs, tables, circuits. 28 ref.

1278* Identification of Platinum-188. Robert A. Naumann. *Physical Review*, v. 96, ser. 2, Oct. 1, 1954, p. 90-92.

An unstable even-even neutron-deficient Pt isotope with a half-life of 10.3±0.4 days was prepared and assigned a mass number 188. Graphs, diagram. 11 ref.

1279 Model for Nuclear Reactions With Neutrons. H. Feshbach, C. E. Porter, and V. F. Weisskopf. *Physical Review*, v. 96, ser. 2, Oct. 15, 1954, p. 448-464.

Three-dimensional diagrams for cross sections and angular distribution from theoretical and observed data. Graphs. 49 ref.

1280 Precision Measurement of the Negative Pion Mass From Its Radiative Absorption in Hydrogen. Kenneth M. Crowe and Robert H. Phillips. *Physical Review*, v. 96, ser. 2, Oct. 15, 1954, p. 470-483.

High-energy pair spectrometer using focus of 90° wedge-shaped magnetic field; theoretical and observed data. Diagrams, graphs, tables. 48 ref.

1281* Pathogenesis and Pathology of Post-Irradiation Infection. V. P. Bond, M. S. Silverman, and E. P. Cronkite. *Radiation Research*, v. 1, Oct. 1954, p. 389-400.

Effect of total-body radiation on two distinct syndromes related to failure of bowel and bone marrow function. Table. 50 ref.

1282 Chicago Radiocarbon Dates. V. W. F. Libby. *Science*, v. 120, Nov. 5, 1954, p. 733-742.

Shows application to specimens dating over the last 20,000 yr. Table. 5 ref.

1283 Materials Development for the Submarine Thermal Reactor. William A. Johnson. *Westinghouse Engineer*, v. 14, Nov. 1954, p. 208-212.

Use of Zr; corrosion, wear of materials, and coolant development. Photographs, diagram.

1284* (Semiphenomenological Theory of the Reaction of π-Mesons With Nucleons.) **Polufenomenologicheskaia teoriia vzaimodeistviia π-mezonov s nuklonami. I.** (Scattering of π-Mesons by Nucleons.) **Rasseianie π-mezonov nuklonami.** I. E. Tamm, Iu. A. Gol'fand, and V. Ia. Fainberg. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 26, no. 6, June 1954, p. 649-667.

Interaction of nucleons with meson fields. Graphs. 14 ref.

1285* (Kinetic Equation for Electrons in Metals in Strong Fields.) **Kineticheskoe uravenie dlia elektronov v metallakh v sil'nykh poliakh.** V. P. Shabanskii. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 27, no. 2(8), Aug. 1954, p. 142-146.

Analysis of collisions with the variation in absolute magnitude of electron impulse. 2 ref.

Books and Miscellaneous Publications

1286 Nuclear Engineering. F. J. Antwerpen, editor. Pt. II. 259 p. 1954. American Institute of Chemical Engineers. New York. (QC776 Am35n)

Papers presented at the first international congress on peace-time uses of atomic energy.

1287 The Quantum Theory of Radiation. W. Heitler. International Series of Monographs on Physics. 3rd Ed. 430 p. 1954. Oxford University Press, London. (QC475 H36q3)

First systematized account of the cosmic ray theory, including some account of the theory of the passage through matter of charged particles of high energy as well as radiation, and the electrodynamics of electrons and positrons.

1288 Introduction to Nuclear Engineering. Richard Stephenson. Chemical Engineering Series. 387 p. 1954. McGraw-Hill Book Company, Inc., New York. (TK9145 St45i)

Principles and basic calculations in nuclear physics for the engineer in fisson, reactors, shielding, materials, isotopes, chemical processes, and special techniques.

See also:

55 (tracers in soil science)
68 (tracers in plant research)
101 (effects of X-rays on rats)
142 (tracers in study of ferrites)
227 (continuous recording of radioactivity)
296 (tracers in herbicide studies)
343 (radiation chemistry of H_2O)

359 (separation of isotopes)
397 (ceramic coatings for nuclear reactors)
663 (economics of reactors)
691 (irradiation of foods)
748 (tracers in printing industry)
823 (optical instrumentation)
949 (tracers in metallurgical measurements)
963 (fission products extraction)
1046 (tracers in wear testing)
1053 (effects of irradiation on creep of Al)
1102 (radiation effects on structural materials)
1371 (enriching isotopes by d.c. discharge)

OPERATIONS RESEARCH AND MANAGEMENT ENGINEERING

1289 Application of Operations-Research Techniques to Air-Borne Weapon System Planning. Robert A. Bailey. *Aeronautical Engineering Review*, v. 13, Oct. 1954, p. 72-79.

Processes, methods, and techniques of an operations-analysis group in basic planning of design and production. Diagrams, graphs, table.

1290 The Employer's Rights in Employees' Inventions. Albert Woodruff Gray. *Audio*, v. 38, Oct. 1954, p. 37, 90.

Principles; recent court decisions. 5 ref.

1291 The Supervisor: Member of Two Organizational Families. Floyd C. Mann and James K. Dent. *Harvard Business Review*, v. 32, Nov.-Dec. 1954, p. 103-112.

Effectiveness, position, rating, and development studies. Graphs, tables.

1292 Automation: Today's Challenge to Process Engineers. *Iron Age*, v. 174, Oct. 21, 1954, p. 213-236.

Collection of seven papers giving principles and specific examples of benefits gained by mechanized handling in production of metal articles. Photographs, diagrams.

1293 Research Laboratories of A.I.A.G. Neuhausen. A. von Zeerleder. *Metal Industry*, v. 85, Sept. 24, 1954, p. 267-270.

Organization, equipment, and aims of the Aluminum Industries A. G. research program. Photographs, graph, table.

1294 Research in Canada. Harold J. Roast. *Metal Progress*, v. 66, Oct. 1954, p. 138-140.

Government-sponsored scientific research in Canada is a $35,000,000 business carried on by the National Research Council in 15 large and modern buildings by a staff of 2000. Varied metallurgical projects, both scientific and practical, are pursued. Photographs.

1295* **New Patent Act Will Improve Patent System.** Vanderveer Voorhees. *Petroleum Engineer (Management Edition)*, v. 26, Oct. 1954, p. C57-C60, C62.

New law clarifies what is patentable, contributory infringement, and the "Flash of Genius" notion. Photographs.

1296* (Injuries From Chemicals Used in Industry and in the Laboratory.) **Kjemisk betingede skader i industri og laboratorium.** Karl Wülfert. *Teknisk Ukeblad*, v. 101, no. 32, Sept. 9, 1954, p. 705-710.

Harmful effects of chemical and other toxic dusts and fumes on personal health. Tables. 5 ref.

1297* (Technical Statistics in Production Control.) **Technische Statistik bei der Fertigungsüberwachung.** G. Wagner. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 25, Sept. 1, 1954, p. 847-854.

Modern methods of continuous quality control designed primarily to detect the sources of defects. Considers production with and without specified tolerances. Graphs, tables, charts, photograph. 14 ref.

Books and Miscellaneous Publications

1298 How to Increase Executive Effectiveness. Edward C. Bursk, editor. 163 p. 1954. Harvard University Press, Cambridge. (HF5500 B94h)

Ways and means for evaluating and increasing effectiveness, creating company "climate" for executive growth, developing company policies, and proper selecting and training for specific areas of management.

1299 Business, Legal, and Ethical Phases of Engineering. D. T. Canfield and J. H. Bowman. 2nd Ed. 365 p. 1954. McGraw-Hill Book Company, New York. (TA157 C16b2)

Business organizations; securities; accounting procedures. Cost determination. Business law. Engineering procedures.

1300 Centennial of Engineering, 1852-1952. History and Proceedings of Symposia. Lenox R. Lohr, editor. 1079 p. 1953. Museum of Science and Industry, Chicago. (T23 C33)

General review of progress in the field of engineering and papers on all the basic sciences completing the story of the development of American industry.

1301 Seminar on Operations Research. D. G. Malcolm, editor. 131 p. 1954. Railway Systems & Procedures Association, New York. (T58 Se52)

Fourteen papers on application of operations research procedures to railway management and other problems.

1302 Human Conditioning in the Factory. Thomas K. Meakin, editor. 86 p. 1954. Human Conditioning Group, New York. (T57 H88)

Managements' interests in considering the worth of adapting the physical work environment to human needs.

1303 A Policy for Scientific and Professional Manpower. Prepared by the National Manpower Council. 263 p. 1953. Columbia University Press, New York. (HD7824 N21p)

Evaluation of manpower problems of concern to U. S. in the period of emergency and to recommend constructive policies for their solution.

1304 Statistics in Research. Bernard Ostle. 487 p. 1954. Iowa State College Press, Ames. (QA276 Os7s)

Basic concepts and techniques for measurement and enumeration of data, correlation methods, and analysis; applications of the statistical method.

1305 Statistics for Technologists. C. G. Paradine and B. H. P. Rivett. 288 p. 1953. D. Van Nostrand Company, Inc., New York. (QA276 P21s)

Statistical parameters. Samples. Theory of errors. Variance and probit analysis. Correlation.

1306 Biometrika Tables for Statisticians. E. S. Pearson and H. O. Hartley, editors. v. I. 238 p. 1954. Cambridge University Press, London. (QA47 P31b)

Normal probability function; distribution and auxiliary tables.

See also:
205 (toxicology and safety in the chemical industry)
436 (corrosion research)
595 (process-control problems)
636 (statistical analyzer for quality control)
1060 (metallurgical research)
1271 (storage of radiation film-badges)
1435 (statistical quality control)

ORE AND MATERIALS BENEFICIATION

1307 Increase Yield of Alumina. *Chemical Engineering*, v. 61, Nov. 1954, p. 334-337.

Modification of Bayer process recovers 90% of alumina. Photographs, flowsheets.

1308* (Problem of the Reaction of Reagents With Zinc Blende.) **K voprosu o vzaimodeistvii reagentov s tsinkovoi obmankoi.** I. N. Plaksin and G. N. Khozhinskaia. *Doklady Akademii Nauk SSSR*, v. 97, no. 6, Aug. 21, 1954, p. 1045-1046.

Effect of lime on absorption of ethyl xanthogenate by ZnS. Flotation with and without activation by blue vitriol. Effect of Fe impurities. 3 ref.

Ore and Materials Beneficiation

1309 High-Capacity Magnetic Filter Treats Magnetite Concentrates. Bengt G. Fagerberg. *Engineering and Mining Journal*, v. 155, Oct. 1954, p. 77-79.

Equipment and operating characteristics. Diagrams, graphs, photograph, tables.

1310* (Physico-Technical Principles of Dehydration, Clarification, and Thickening.) **Die physikalisch-technischen Grundlagen der Entwässerung, Klärung und Eindickung.** Pieter Gerard Meerman. *Glückauf*, v. 90, nos. 35-36, Aug. 28, 1954, p. 955-964.

Theoretical and economical methods of drying coal, clarifying wash water, and concentrating slime. Diagrams, tables. 19 ref.

1311* (Recovery of Aluminum Oxide.) **Otrzymywanie tlenku glinu.** Julian Kwiatkowski. *Hutnik*, v. 21, no. 7, July 1954, p. 212-217.

Raw materials; alkali, acid, and electrothermal sintering and sintering processes. Tables, diagrams. 2 ref.

1312* Note on the "Optimum Degree" of Coal Washing. J. K. Matthews. *Institute of Fuel, Journal*, v. 27, Sept. 1954, p. 430-437.

Calculations to determine amount of washing to remove foreign matter without removing undue amount of carbonaceous material. Tables, graphs.

1313* (Aspects of Swedish Iron Ore Concentration.) **Några synpunkter på den svenska järnmalmsanrikningen.** P. G. Kihlstedt. *Jernkontorets Annaler*, v. 138, no. 9, 1954, p. 499-526; disc., p. 526-538.

Survey of practices to determine best system for Swedish conditions. Tables, graphs. 20 ref.

1314 Titanium Ores Flow From Australian Beaches. George Farwell. *Light Metal Age*, v. 12, Oct. 1954, p. 30-31.

Reserves, composition, and separation methods of black beach sands. Photograph.

1315* (The Leaching of Sulfide Minerals Under Oxygen Pressure.) **Über die Laugung von Sulfidmineralien unter Sauerstoffdruck.** G. Björling. *Metall*, v. 8, nos. 19-20, Oct. 1954, p. 781-784.

Advantages and disadvantages of floating sulfide ores of Fe, Cu, Zn, Pb, Ni, and Co under O_2 pressure and chemical reactions of the sulfides with O. Diagrams. 7 ref.

1316 The Five Major Advances in Nonferrous Ore Dressing. C. H. Benedict. *Mining Engineering*, v. 6, Oct. 1954, p. 976-977.

Discussion of developments in shaking tables, fine grinding, hydraulic classification, mechanical thickeners, and flotation.

1317 Steadily Growing Southeastern Tungsten Production. John V. Hamme. *Mining Engineering*, v. 6, Oct. 1954, p. 978-982.

Improvements in processing plant result in increased W ore production. Description of equipment and operating procedures. Table, flowsheets, photographs.

1318 Statistical Analysis Points the Way for $$$$ Savings in Beneficiation. A. C. Dorenfeld. *Mining Engineering*, v. 6, Oct. 1954, p. 986-988.

Evaluation when ore changes; analysis of process changes. Graphs, tables. 4 ref.

1319 Analysis of Variables in Rod Milling. Will Mitchell, Jr., C. L. Sollenberger, T. G. Kirkland, and B. H. Bergstrom. *Mining Engineering*, v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 199, Oct. 1954, p. 1001-1009.

Studies of continuous rod milling of limestone. Tables, graphs, photograph, diagram. 11 ref.

1320* Filtration and Drying Methods in Wet Metallurgical Processes. C. C. Downie. *Mining Journal*, v. 243, Sept. 24, 1954, p. 342-343.

Vacuum filters, dryers, and filtering arrangements. Details of the filtration and drying activities in the metallurgical field encompassing the drying of precipitates and crystals and rotary vacuum dryers. 9 ref.

1321* The Role of the Electric Potential at the Phase Boundary in Flotation. (English.) Onzo Jyo. *Science Reports of the Research Institutes, Tohoku University*, ser. A, v. 6, no. 3, June 1954, p. 259-287.

Equations for the theoretical relationship of the ζ-potential and floatability. Zeta-potential data is not sufficient to anticipate change of floatability. Tables, graphs, diagram. 96 ref.

1322 Preparation Characteristics of Coal From Raleigh County, W. Va. J. W. Miller, T. R. Jolley, and M. Sokaski. *U. S. Bureau of Mines, Report of Investigations* 5070, Sept. 1954, 32 p. (TN21 Un3r)

Test procedures and results. Graphs, diagrams, tables, map. 12 ref.

1323 Laboratory Evaluation of Vacuum Flotation for Cleaning Coal Fines. H. L. Riley and B. W. Gandrud. *U. S. Bureau of Mines, Report of Investigations* 5071, Aug. 1954, 33 p. (TN21 Un3r)

Investigation of the Elmore vacuum-flotation process for cleaning and handling fine coal, and an evaluation of relative efficiencies of vacuum and mechanical laboratory froth flotation cells. Graphs, tables, photograph, diagram. 5 ref.

1324 Recovery of Ultrafine Mineral Values—A Progress Report. K. K. Kershner and A. A. Cochran. *U. S. Bureau of Mines, Report of Investigations* 5076, Sept. 1954, 7 p. + 3 plates. (TN21 Un3r)

Recovery of cassiterite from Sn ore slimes. Tables, graphs, photograph. 9 ref.

1325 Beneficiation of a Brazilian Phosphate Rock. M. M. Fine and D. W. Frommer. *U. S. Bureau of Mines, Report of Investigations* 5078, Sept. 1954, 9 p. (TN21 Un3r)

Satisfactory procedure was developed. Test procedures and results. Tables, photographs. 4 ref.

1326* (Present Preparation of Coal in Western Germany. Lump Coal.) **Die gegenwärtige Steinkohlen-Aufbereitung in Westdeutschland. Stückkohle.** A. Götte. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 96, no. 27, Sept. 21, 1954, p. 917-923.

Methods and equipment for screening, washing, and crushing. Photographs, diagrams, graphs. 2 ref.

See also:
130 (preparation of coral for concrete aggregate)
202 (kinetics of grinding process)
352 (monomolecular layers in flotation)
789 (grading of ores and coal)

PHYSICS

1327 Measurement of Dispersion of Velocity of Sound in Liquids. Edwin L. Carstensen. *Acoustical Society of America, Journal*, v. 26, Sept. 1954, p. 858-861.

Method and apparatus. Diagrams, table, graphs. 7 ref.

1328* (Electroluminescence of Silicon Carbide Crystals, Excited by Direct Current.) **Über die durch Gleichstrom angeregte Elektrolumineszenz von Siliziumkarbidkristallen.** G. Szigeti. *Acta Physica Academiae Scientiarum Hungaricae*, v. 4, no. 1, 1954, p. 65-77.

Experiments for measuring the electroluminescent spectrum of SiC. Dependence of electrical properties on temperature. Graphs, tables. 17 ref.

1329* (Ceramic "Rectangular" Ferrites.) **Die keramischen "Rechteck"—Ferrite.** E. Albers-Schönberg and O. Eckert. *Berichte der deutschen keramischen Gesellschaft*, v. 31, no. 9, Sept. 1954, p. 311-314.

Discusses ferrites with rectangular hysteresis curve. Use and operation in electronic computers. Diagrams, graphs, table, photographs. 14 ref.

1330 Velocity of Ultrasonic Waves in Saturated Vapors of Organic Liquids. V. F. Nozdrev. *Henry Brutcher, Altadena,*

Calif., Translation no. 2973, 7 p. (From *Doklady Akademii Nauk SSSR*, v. 85, no. 4, 1952, p. 777-779.)

Equipment, procedure, variable temperature effects, and frequencies used for study of superheated and saturated vapors. Graphs. 8 ref.

1331 Metastable States of $BaTiO_3$. N. S. Novosil'tsev, A. L. Khodakov, and M. S. Shul'man. *Henry Brutcher, Altadena, Calif., Translation no.* 2980, 4 p. (From *Doklady Akademii Nauk SSSR*, v. 83, no. 6, 1952, p. 829-831.)

Previously abstracted from original. See item 11271, v. 1, Aug. 1952.

1332 A Logarithmic Photometer. H. L. Grant and R. W. Stewart. *Canadian Journal of Physics*, v. 32, Oct. 1954, p. 674-677 + 1 plate.

Construction by layers of opalescent Plexiglas separated by sheets of polished foil or shimstock. Photographs, table, graphs.

1333 Properties and Uses of Ferrites. H. F. Remde. *Ceramic Age*, v. 64, sec. 1, Sept. 1954, p. 16-18, 59.

Types; magnetic and crystalline properties; applications. 8 ref.

1334* (Measuring Specific Heats of Poorly Heat-Conductive Substances by Means of E. Calvet's Differential Microcalorimeter.) **Mesure des chaleurs spécifiques de corps mauvais conducteurs de la chaleur, au moyen du microcalorimètre différentiel de E. Calvet.** Jacques Brouty and Édouard Calvet. *Comptes rendus*, v. 239, no. 11, Sept. 13, 1954, p. 672-674.

Calculation and application of corrections to the experimental data.

1335* (Separation of Energy Levels of an Activator in a Crystal Field.) **Rasshcheplenie rovnei energii aktivatora v pole kristalla.** K. V. Shalimova. *Doklady Akademii Nauk SSSR*, v. 97, no. 4, Aug. 1, 1954, p. 651-653.

Studies of absorption and emission spectra of phosphors. Table. 6 ref.

1336* (One Variation of the Boundary Condition of the Plane Problem of the Theory of Elasticity.) **Ob odnom izmenenii kraevogo usloviia ploskoi zadachi teorii uprugosti.** V. Ia. Natanzon. *Doklady Akademii Nauk SSSR*, v. 98, no. 1, Sept. 1, 1954, p. 27-29.

Includes 14 equations. Graphs.

1337* Testing Point-Contact Transistors for Pulse Applications. R. L. Wooley. *Electrical Engineering*, v. 73, Nov. 1954, p. 981-987.

Methods and results for applications to large-signal pulse circuits. Graphs, table, circuits. 6 ref. (To be continued.)

1338 Method of Averages and Its Comparison With the Method of Least Squares. Morris Morduchow. *Journal of Applied Physics*, v. 25, Oct. 1954, p. 1260-1263.

Discussion on curve fitting.

1339 Focusing of a Long Cylindrical Electron Stream by Means of Periodic Electrostatic Fields. Ping King Tien. *Journal of Applied Physics*, v. 25, Oct. 1954, p. 1281-1288.

Use of bifilar helix or series of annular rings to produce periodic electric fields. Diagrams, graphs, table. 8 ref.

1340 Electronic Structure of Disordered One-Dimensional Chains. Rolf Landauer and Joseph C. Helland. *Journal of Chemical Physics*, v. 22, Oct. 1954, p. 1655-1665.

Numerical evaluation of the positions of the electronic levels in disordered alloys and liquids over a wide range of energies. Tables, graphs, diagrams. 8 ref.

1341 Electron Trap Distributions in Phosphors. J. M. Honig. *Journal of Chemical Physics*, v. 22, Oct. 1954, p. 1689-1692.

Method for computing distribution of activation energies among filled traps from decay curves. 10 ref.

1342 Magnetic Dipolar Interactions in MnO and in Ferrites. Jerome I. Kaplan. *Journal of Chemical Physics*, v. 22, Oct. 1954, p. 1709-1712.

Calculation of the magnetic dipole energies of MnO and of the normal and inverse spinel structures. Diagrams, table. 8 ref.

1343* Low Temperature Physics. David Shoenberg. *Journal of Scientific & Industrial Research*, v. 13, sec. A, Aug. 1954, p. 355-362.

Review of cryogenic significance, aims, achievements, and future possibilities.

1344* A Crystal Comparator. B. R. V. Vardan and H. D. Krishna Prasad. *Journal of Scientific & Industrial Research*, v. 13, sec. B, Aug. 1954, p. 530-534.

Development of a quick and accurate method for measurement of frequency differences of a number of crystals ground for a certain frequency, also used as a meter for frequency measurements in the range 0 to 60 kc. per sec. Diagram, circuit, wave patterns.

1345 Photometry of the Microscope With Special Reference to Projection. F. E. J. Ockenden. *Journal of Scientific Instruments*, v. 31, Sept. 1954, p. 309-313.

Transmission losses occurring in microscope optical systems are discussed and their effect on the brightness of both visual field and projected images is estimated. Tables, diagrams, 10 ref.

1346 The Preparation and Properties of Pressed Alkali Halide Disks With Special Reference to Their Use in Spectroscopy. M. A. Ford and G. R. Wilkinson. *Journal of Scientific Instruments*, v. 31, Sept. 1954, p. 338-341.

Vacuum mold and press for pressing alkali halide powders into disks with optical qualities similar to crystals of the same thickness. Diagram, photograph, graphs, micrograph, table. 6 ref.

1347* (The Demonstration and Measuring of Magnetostrictive Vibrations by the Capacitative Method.) **Magnetosztrikciós rezgések kimutatása és mérése kapacitív úton.** Tamás Tarnóczy and László Tari. *Magyar Fizikai Folyóirat*, v. 2, no. 3, 1954, p. 153-158.

Method based on effect of the condenser microphone. Diagrams. 5 ref.

1348* Research of the Resolving Power of the Electron Microscope. (English.) Tokio Inoue. *Memoirs of the Faculty of Engineering, Kyoto University*, v. 16, no. 3, July 1954, p. 113-146.

Derivations of formulas for resolving power, resolution, and aberration. Diagrams, table, micrographs, graphs. 10 ref.

1349 Chart Distortion in the Construction of Nomograms. Clyde H. Kearns. *Ohio State University. Engineering Experiment Station, News in Engineering*, v. 26, Nov. 1954, p. 23-27.

Principles and examples of use in construction of various types of diagrams. Nomograms. 6 ref.

1350 The Luminosity of Spectrometers With Prisms, Gratings, or Fabry-Perot Etalons. Pierre Jacquinot. *Optical Society of America, Journal*, v. 44, Oct. 1954, p. 761-765.

Formulas relating flux to resolving power and dimensions of dispersive system. Diagrams, graphs. 9 ref.

1351* (Geometrical Optics of the Two-Ray Interferometer.) **Zur geometrischen Optik der Zweistrahl-Interferometer.** H. Slevogt. *Optik*, v. 11, no. 8, 1954, p. 366-379.

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1352* The Optical Spectrum of Plutonium and Its Hyperfine Structure. (English.) Martha Van den Berg and P. F. A. Klinkenberg. *Physica*, v. 20, no. 8, Aug. 1954, p. 461-480 + 1 plate.

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1353* Secondary Electron Emission by Photoelectric Action and Ion Bombardment at the Cathode in Corona Breakdown of Argon. Laura Colli and Ugo Facchini. *Physical Review*, v. 96, ser. 2, Oct. 1, 1954, p. 1-4.

Secondary cathode mechanisms active in coaxial cylindrical argon-filled counter tubes with positive central wire at various gas pressures. Photographs. 20 ref.

1354* Space Charge Formation and the Townsend Mechanism of Spark Breakdown in Gases. R. W. Crowe, J. K.

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Bragg, and Virginia G. Thomas. *Physical Review*, v. 96, ser. 2, Oct. 1, 1954, p. 10-14.

Includes graphs. 11 ref.

1355 Effect of Oxygen on the Electrical Properties of Lead Telluride Films. Donald E. Bode and Henry Levinstein. *Physical Review*, v. 96, ser. 2, Oct. 15, 1954, p. 259-265.

Experimental procedures and results on changes in resistance, photoresistivity and photovoltaic effect. Diagrams, graphs. 9 ref.

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Sunlight exposure gave 0.4 volts and 0.6 volts respectively for open-circuit and short-circuit measurements. Graph. 2 ref.

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Theory, experiments, and results. Circuit, histograms, photograph, graphs, tables. 11 ref.

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Comparison of theory with experimental results. Table, diagrams, photographs, graphs. 25 ref.

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1361* Conservation Laws in Classical and Quantum Physics. Eugene P. Wigner. *Progress of Theoretical Physics*, v. 11, Apr.-May 1954, p. 437-440.

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1362* Statistical Mechanics of Surface Tension of Curved Interface. I. Tomio Segawa and Ei Teramoto. *Progress of Theoretical Physics*, v. 11, June 1954, p. 528-536.

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1363* Heat Transfer by Free Convection Across a Closed Cavity Between Vertical Boundaries at Different Temperatures. G. K. Batchelor. *Quarterly of Applied Mathematics*, v. 12, Oct. 1954, p. 209-233.

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1366* The Effect of Thermally Produced Lattice Defects on the Electrical Properties of Tellurium. (English.) Seiichi Tanuma. *Science Reports of the Research Institutes, Tohoku University*, ser. A, v. 6, no. 2, Apr. 1954, p. 159-171.

Attempt to evaluate the effect of the acceptor action of thermally produced lattice defects to the electrical properties of Te, especially the thermoelectric power and Hall effect. Graphs, tables. 14 ref.

1367* (Ferrite Masses.) **Ferritmassen.** Friedrich Reinhart. *Sprechsaal*, v. 87, no. 18, Sept. 20, 1954, p. 451-453.

Composition, production, properties, and uses of Mn-Zn and other ferrites. Tables.

1368* (Interference Experiments With Electrons.) **Interferenzversuche mit Elektronen.** Otto Rang. *Umschau in Wissenschaft und Technik*, v. 45, no. 20, Oct. 15, 1954, p. 619-623.

Report of studies on the mutual effect of electron beams and the use of electron interferences in the investigation of the microstructure of matter and of the wave nature of electrons. Diagrams, micrographs. 4 ref.

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Developments in electric lamps. Photographs, diagrams, tables, graph.

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1371* (Enriching of Isotopic Molecules in the DC Spark Discharge.) **Anreicherung isotoper Moleküle in der Gleichstrom-Glimmentladung. III.** (The Primary Effect. Mass-Spectrometric Determination of the Relative Ion Frequencies in the Discharge Plasma.) **Der Primäreffekt. Massenspektrometrische Bestimmung der relativen Ionenhäufigkeiten im Entladungsplasma.** H. D. Beckey and H. Dreeskamp. *Zeitschrift für Naturforschung*, v. 9a, no. 9, Sept. 1954, p. 735-740.

Experimental tests of the theory using H atoms, and a mixture of H and deuterium. Circuit, diagram, graphs, tables. 2 ref.

1372* (Measuring the Decay Time of Luminescence During Excitation by Electrons.) **Messung von Abklingzeiten der Lumineszenz bei Anregung durch Elektronen.** W. Hanle and H. G. Jansen. *Zeitschrift für Naturforschung*, v. 9a, no. 9, Sept. 1954, p. 791-797.

Mechanism of energy transmission of anthracene in napthalene or in liquid solution. Diagram, circuit, graphs, tables. 12 ref.

1373* (Theory on Impact Ionization by Electrons in Insulating Crystals.) **Theorie der Stossionisation durch Elektronen in isolierenden Kristallen.** Ludwig Tewordt. *Zeitschrift für Physik*, v. 138, no. 5, 1954, p. 499-514.

Theory based on total electron states of crystals; determination of total probability of impact ionization as a function of energy of impacting conduction electron; distribution of excess energy of impact ionization to the colliding "partners". Diagrams, graphs. 7 ref.

1374* (Experimental Investigations on the Expansion of Resonance Terms.) **Experimentelle Untersuchungen zur Verbreiterung von Resonanztermen.** P. Gerthsen. *Zeitschrift für Physik*, v. 138, no. 5, 1954, p. 515-528.

Measurement of the Width of the infra-red line and of the yellow Hg line from a high-pressure Hg discharge at different currents; determination of resonance-term expansion by extrapolation of yellow-line width to zero amperage. Photographs, diagrams, graphs, tables. 12 ref.

1375* (Field of Radiation on the Rear of a Crystal in Electron Interferences.) **Das Strahlungsfeld auf der Kristallrückseite bei Elektroneninterferenzen.** H. Niehrs. *Zeitschrift für Physik*, v. 138, no. 5, 1954, p. 570-597.

Appearance of two wave fields in irradiated crystals which decompose independently into four waves when emerging into the vacuum from a plane not parallel to the plane of incidence. Diagrams, table, micrographs. 13 ref.

1376* (Absorption Spectrum and Photochemistry of Silver-Halide Crystals With Addition of Sulfur, Selenium, and Tellurium.) **Absorptionsspektrum und Photochemie von Silberhalogenidkristallen mit Schwefel-, Selen- und Tellurzusatz.** Christian Volke. *Zeitschrift für Physik*, v. 138, no. 5, 1954, p. 623-634.

Lattice absorption of Ag_2Te, Ag_2S and Ag_2Se in AgBr or AgCl crystals. Study of absorption spectra of such perturbed crystals and of photochemical reactions in AgCl-Ag_2Se and AgBr-Ag_2Se solid solutions. Graphs, tables. 14 ref.

1377* Ultrasonic Absorption Constant in Liquids by an Improved Optical Method. (English.) S. Parthasarathy and M. Pancholy. *Zeitschrift für Physik*, v. 138, no. 5, 1954, p. 635-639.

Measuring equipment and procedures. Photographs, diagram, table. 9 ref.

1378* (Thermodynamic Theory of Antiferroelectrics.) **K termodinamicheskoi teorii antisegnetoelektrikov.** G. A. Smolenskii and V. Kh. Kozlovskii. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, v. 26, no. 6, June 1954, p. 684-695.

Phase transitions from antiferroelectric state to paraelectric and ferroelectric states. Diagram, graphs. 7 ref.

Books and Miscellaneous Publications

1379 The Physics of Experimental Method. H. J. J. Braddick. 404 p. 1954. John Wiley & Sons, Inc., New York. (QC41 B72p)

Presents fundamental physical principles of measurement, the reduction of observations, and the statistical analysis of errors; emphasizes essential dependence of physical measurement on material properties, and of their proper use in construction or design.

1380 Theoretical Elasticity. A. E. Green and W. Zerna. 442 p. 1954. Oxford University Press. London. (QC191 G82t)

General theory of finite elastic deformations; complex variable methods for two-dimensional problems for isotropic and acolotropic bodies; and the shell theory.

1381 The Determination of Crystal Structures. H. Lipson and W. Cochran. v. III of The Crystalline State. Lawrence Bragg, editor. 345 p. 1953. G. Bell and Sons, Ltd., London. (QD905 B73c)

X-ray optics; use of space groups; calculation of structure factors.

1382 Optics. Arnold Sommerfeld. v. IV. Lectures on Theoritical Physics. 383 p. 1954. Academics Press, Inc., New York. (QC20 So55vtr) (Translated from the German by Otto Laporte and Peter A. Moldauer.)

Introduction to theorical optics on reflection, refraction, moving media, dispersion, crystals, and diffraction.

1383 Linear Analysis. Adriaan Cornelis Zaanen. 601 p. 1953. North-Holland Publishing Company, Amsterdam. QA265 Z10L)

Measure and integral; Banach and Hilbert space; linear integral equations.

1384 Higher Transcendental Functions. Bateman Manuscript Project. v. I-II. 302 and 396 p. 1953. McGraw-Hill Book Company, Inc., New York. (QA351 B31h)

Gamma, hypergeometric, elliptic, Legendre, and Bessel functions. Orthogonal and spherical polynomials.

1385 Tables of Integral Transforms. Bateman Manuscript Project. v. I. 391 p. 1954. McGraw-Hill Book Co., New York. (QA351 B31t)

Fourier, Laplace, and Mellin transforms.

1386 The Theory of Electromagnetic Waves. 393 p. 1951. Interscience Publishers, Inc., New York. (QC661 T34)

Twenty-one papers presented at the 1950 Symposium covering theoretical and experimental investigations on the dynamics and structure of the atmosphere, hydrosphere, and lithosphere, and the relationships and energy transference among them; wave guide and cavity theory; diffraction and reflection of H.F. waves; propagation; antennas.

See also:
608 (simulator for interference films)
646 (gas-filled photocells)
802 (cine spectrograph)
808 (light scattering at high temperatures)
812 (scintillation spectrometer)
821 (calculation of field strengths)
1092 (photoelasticity)

PLASTICS

1387 Chain Transfer in the Hydroperoxide Initiated Polymerization of Styrene. Cheves Walling and Yu-wei Chang. *American Chemical Society, Journal*, v. 76, Oct. 5, 1954, p. 4878-4883.

Studies polymerization with *t*-butyl and cumene hydroperoxides in benzene at 70 C. Tables, graphs, 31 ref.

1388* (Confirmation of the Structure of Polymer-Uniform Linear Polyester.) **Über den Nachweis des polymereinheitlichen Aufbaues linearer Polyester.** Hans Batzer. *Angewandte Chemie*, v. 66, nos. 17-18, Sept. 7, 1954, p. 513-519.

Assembly of macro-compounds is shown by examination of linear polyesters. Tables, graphs. 54 ref.

1389* Structural Plastics Used in Marine Construction. J. B. Alfers and W. R. Graner. *Bureau of Ships Journal*, v. 3, Oct. 1954, p. 12-15.

Characteristics of plastic materials for hulls, pipe, and tanks. Photographs, diagrams.

1390* Adaptable Nylon. Jane S. Muller. *Compressed Air Magazine*, v. 59, Oct. 1954, p. 285-287.

The desirable characteristics of nylon have resulted in its becoming an important engineering material in a molded form. Photographs.

1391* Chemistry and Technology of Resistant Plastics. I. V. E. Yarsley and A. G. Goodchild. *Corrosion Prevention and Control*, v. 1, July 1954, p. 275-281, 319.

Includes structural formulas.

1392* (Influence of Plasticizing Additions on the Mechanical Properties of Polyvinyl Chlorides. **O vliianii plastifitsiruiushchikh dobavok na mekhanicheskie svoistva polivinilkhlorida.** R. I. Fel'dman. *Doklady Akademii Nauk SSSR*, v. 97, no. 6, Aug. 21, 1954, p. 1033-1036.

Effects of dioctyl phthalate, tricresyl phosphate, and other plasticizers on relative tearing strength. Tables. 4 ref.

1393 Evaluating Dielectric Properties of Plastics Laminates. S. W. Place. *Electrical Manufacturing*, v. 57, Oct. 1954, p. 95-102.

Presents significant data for dissipation factor and dielectric constant over a frequency range from 10^2 to 10^{10} c.p.s. and at temperatures up to 250 C. Tables, graphs. 4 ref.

1394 Plastics for Dual-Purpose Gear Material. M. R. Alexy. *Electrical Manufacturing*, v. 54, Oct. 1954, p. 107-109.

Three materials survived stringent tests to provide high-voltage R.F. isolation as well as normal mechanical functions. Photographs, table, diagrams.

1395 Plastics Laminates Standards. *Electrical Manufacturing*, v. 54, Nov. 1954, p. 146-148.

Tables listing NEMA, ASTM, military, and other government specifications on sheets, tubes, and rods.

1396* High Molecular Weight Polymethylene. I. The Kinetics of the Copper Salt Catalyzed Decomposition of Diazomethane. C. E. H. Bawn and T. B. Rhodes. *Faraday Society, Transactions*, v. 50, Sept. 1954, p. 934-941.

BF_3 also used as catalyst. Rate of polymerization $= K\ [Cat]\ [CH_2N_2]$. Table, diagram, graphs. 9 ref.

1397* Plastic Pipe Is Gaining Approval. F. H. Bunnell. *Gas Age*, v. 114, Oct. 7, 1954, p. 58-60, 104.

Precautions for using plastic pipe as a liner for low pressure steel gas mains. Diagrams.

Plastics

1398 Plastics. Raymond B. Seymour. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2135-2148.

Plastic pipe and fittings; thermoplastic structures; reinforced plastics; adhesives and coatings; cellular products; review of some standard polymers, copolymers, and resins. Photographs, tables. 316 ref.

1399 Molding Plastic Tips. C. H. Miller. *Instrumentation*, v. 7, no. 4, 1954, p. 17-19.

Temperature control of plastic molding presses. Photographs, diagrams.

1400* Polymer Structure and Properties. Harry Biletch. *Interchemical Review*, v. 13, Autumn 1954, p. 63-74.

Physical properties are related to chemical constitution. Table, diagrams, graphs. 12 ref.

1401* (The Field of High-Molecular Compounds.) **Iz oblasti vysokomolekuliarnykh soedinenii. LXVI.** (Investigation of the Kinetics of Copolymerization of Diisocyanates With Glycols.) **Issledovanie kinetiki sovmestnoi polimerizatsii diizotsianatov s glikoliami.** V. V. Korshak and I. A. Gribova. *Izvestiia Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk*, 1954, no. 4, July-Aug., p. 670-676.

Includes graphs, tables. 4 ref.

1402 The Dynamic Properties of Plasticized Polyvinyl Chloride. M. G. Dilke and J. J. Millane. *Journal of Applied Chemistry*, v. 4, Sept. 1954, p. 507-513.

Measurement; internal structure of plasticized system; evaluating plasticizer efficiency. Graphs, table, photograph, diagram. 9 ref.

1403 Effect of Crystallinity on the Dynamic Mechanical Properties of Polyethylenes. Lawrence E. Nielsen. *Journal of Applied Physics*, v. 25, Oct. 1954, p. 1209-1212.

Includes graphs, table. 10 ref.

1404 Measurement of Orientation in Polystyrene Monofilaments by Means of Double Refraction. R. D. Andrews. *Journal of Applied Physics*, v. 25, Oct. 1954, p. 1223-1231.

Use of optical double refraction. Diagrams, photographs, graphs. 14 ref.

1405 Factors Affecting the Thermal Stability of Polytetrafluoroethylene. R. E. Florin, L. A. Wall, D. W. Brown, L. A. Hymo, and J. D. Michaelsen. *Journal of Research, National Bureau of Standards*, v. 53, Aug. 1954, p. 121-130.

Three mechanistic considerations for increasing thermal stability by use of catalysts, foreign structural units, and additives. Tables, graph. 29 ref.

1406 A Low Cost Injection Molding Material. Kenneth Rose. *Materials & Methods*, v. 40, Oct. 1954, p. 144-146.

Applications of thermoplastic materials with asphalt or resin bonded asbestos fibers have good corrosion resistance but relatively low strength. Photographs.

1407 Weather Aging of Styrene and Phenolic Plastics. J. R. Taylor and C. H. Adams. *Mechanical Engineering*, v. 76, Oct. 1954, p. 803-807.

Test data to help designer select plastics to meet wide range of climatic conditions. Graphs, tables, photograph.

1408* (Methods of Processing and Machining "Akulon" in Comparison to Methods Used for Metals.) **Kort overzicht van de be- en verwerkingsmethoden van Akulon in vergelijking met die van metalen.** *Metalen*, v. 9; *Handel en Industrie*, v. 9, no. 16, Aug. 1954, p. 140-142.

Reviews mechanical processing, injection; and extrusion casting, and centrifugal casting; and properties of nylon products. Photographs, tables.

1409 Shelf Life in Polyethylene. Jules Pinsky, A. R. Nielsen, and J. H. Parliman. *Modern Packaging*, v. 28, Oct. 1954, p. 145-155.

A long-term study of 67 typical chemicals in polyethylene bottles, with data on permeability, chemical, and physical effects. Photographs, graphs, tables.

1410 Emulsions of Polymeric Materials. J. O. Cutter. *Paint Manufacture*, v. 24, Oct. 1954, p. 337-340.

Mechanism of the emulsion polymerization process, the techniques used and physical properties of the resultant products. Photographs. 3 ref.

1411* On the Limitations in the Use of Plastics Due to Their Physical and Structural Properties.) **Über die Grenzen der Einsatzmöglichkeiten der Plaste auf Grund ihrer physikalischen und strukturellen Eigenschaften.** K. Thinius. *Plaste und Kautschuk*, v. 1, no. 1, Jan. 1954, p. 4-7.

Structure and physical, mechanical, and electrical properties of different types of plastic as guides to proper use. Photographs, tables, graphs, diagram. 8 ref. (To be continued.)

1412* (The Structure of Polyvinyl Chloride II.) **Über die Struktur von Polyvinylchlorid II.** O. Seipold and Th. Marx. *Plaste und Kautschuk*, v. 1, no. 1, Jan. 1954, p. 11-13.

Includes micrographs.

1413* (Various New Uses of Vinidur.) **Verschiedene neue Anwendungen von Vinidur.** H. Jungnickel. *Plaste und Kautschuk*, v. 1, no. 2, Feb. 1954, p. 26-29.

Describes and illustrates use of Vinidur in equipment for chemical, textile, food, and construction industries. Photographs, diagram.

1414* (The Reaction of Phenol With Lignins and the Production of Condensation Lignin Resins.) **Die Reaktion von Phenol mit Ligninen und die Herstellung von Lignin-Kondensationsharzen.** A. Rieche and A. Gnüchte. *Plaste und Kautschuk*, v. 1, no. 2, Feb. 1954, p. 36-37.

Use of waste lignin by reacting with 30 to 40% of phenol to form a resin with bakelite-like properties. Not all lignins are equally suitable for this purpose. Structural formulas. 6 ref.

1415* (Structure, Properties, and Use of Epoxide Resins.) **Aufbau, Eigenschaften und Anwendung der Epoxydharze.** H. Jahn. *Plaste und Kautschuk*, v. 1, no. 3, Mar. 1954, p. 50-56.

Chemical structures, methods of processing, properties, and possible uses of the unhardened and hardened resins. Tables. 22 ref. (To be continued.)

1416* (Advances in the Field of Screw Extrusion of PVC.) **Fortschritte auf dem Gebiet des Schneckenpressens von PVC.** F. Tomis. *Plaste und Kautschuk*, v. 1, no. 3, Mar. 1954, p. 57-62.

Mathematical determination of screw designs and effect on efficiency of processing of PVC mixtures. Diagrams, graphs, photograph.

1417* (Unsaturated Polyesters, Laminating Substances of Mineral Fibers, and Casting Resins.) **Ungesättigte Polyester, Mineralfaser-Schichtstoffe und Giessharze.** E. Ulsperger. *Plaste und Kautschuk*, v. 1, no. 4, Apr. 1954, p. 75-82.

Production, chemical structures, processing methods, and uses of polyester resins. Diagrams, tables, photographs, graphs. 16 ref.

1418* (Proper Use of Plastics in the Production of Bearings.) **Die werkstoffgerechte Anwendung von Plasten in der Lagerfertigung.** A. Keil. *Plaste und Kautschuk*, v. 1, no. 5, May 1954, p. 99-102, 116.

Practical suggestions on the production, uses, and lubrication of plastic bearings in conformity with the nature and properties of plastic materials. Table, diagram.

1419* (Determination of Methanol in Commercial Formaldehyde and the Effect of Methanol on the Condensation of Cresol-Formaldehyde Resins.) **Über die Bestimmung von Methanol in technischem Formaldehyd und den Einfluss des Methanols auf die Kondensation von Kresol-Formaldehyd-Harzen.** Wolf-Dieter Jost. *Plaste und Kautschuk*, v. 1, no. 7, July 1954, p. 150-153.

Iodometric determination of methanol in formaldehyde. Method of compensating for effects of methanol on temperature and degree of condensation by prolonging redistilling. Tables, graphs.

1420* (Products of Plastic, Rubbers, and Asbestos.) **Über Produkte aus Plasten bzw. Kautschuken und Asbesten. I.**

(Plastic as a Binder.) **Die Plaste als Bindemittel.** J. Techel. *Plaste und Kautschuk*, v. 1, no. 7, July 1954, p. 153-159.

Review of literature on chemical composition and production of resin produced from furan, furan derivatives, phenols, formaldehyde, urea, and cyanamide. Graphs, table. 48 ref.

1421* (Plastic Axle Bearings for Street-Car Motors.) **Pressstoff-Tatzenlager bei Strassenbahnmotoren.** E. Jacob. *Plaste und Kautschuk*, v. 1, no. 7, July 1954, p. 162-163.

Shows superiority of plastics over metal for friction bearings. Diagrams, photographs, tables.

1422* (Torsion Measurements on Mixtures of Buna With Polyvinyl Chloride or Polystyrene.) **Torsionsmessungen an Mischungen von Buna mit Polyvinylchlorid oder Polystyrol.** W. Breuers, W. Hild, H. Wolff, W. Burmeister, and H. Hoyer. *Plaste und Kautschuk*, v. 1, no. 8, Aug. 1954, p. 170-173.

Experimental results on the modulus of torsion, damping constants, and mechanical properties of mixtures as functions of temperature. Diagram, photographs, graphs. 8 ref.

1423* (Recent Developments in the Field of Polyvinyl Chloride (PVC).) **Neuere Entwicklungen auf dem Polyvinylchlorid-(PVC)-Gebiet.** A. Iloff. *Plaste und Kautschuk*, v. 1, no. 8, Aug. 1954, p. 178-180.

Different methods of polymerizing and comparison of properties of PVC's produced by different methods. Table.

1424* (Applications of Ethoxyline Resins.) **Toepassingsontwikkeling van aethoxylineharsen.** A. J. Wildschut. *Plastica*, v. 7, no. 9, Sept. 1954, p. 432-435.

Historical background and applications, such as casting resins for the embedding of radio-parts, adhesives and laminating resins, foams, paints, and lacquers. Photograph.

1425* (Protein-Plastics.) **Kunststoffen op eiwit-basis.** E. M. Petri. *Plastica*, v. 7, no. 9, Sept. 1954, p. 449-451.

Chemistry, processing, and applications. Diffraction pattern.

1426 Fluorocarbon Plastics Today. Henry Lee. *Product Engineering*, v. 25, Oct. 1954, p. 168-173.

Physical, mechanical, and electrical properties of basic types are compared; potential commercial applications. Graphs, photographs, tables, diagrams.

1427 A Thermocouple Method of Following the Non-Stationary State of Chemical Reactions. I. The Evaluation of Velocity Coefficients for Vinyl Acetate, Methyl Methacrylate, and Butyl Acrylate Polymerization Reactions. W. I. Bengough and H. W. Melville. *Royal Society, Proceedings*, v. 225, ser. A, Sept. 14, 1954, p. 330-345.

Includes diagrams, photograph, graphs, tables. 18 ref.

1428 The Absorption of Organic Vapours by Thin Films of Nitrocellulose. E. C. Baughan, A. L. Jones, and K. Stewart. *Royal Society, Proceedings*, v. 225, ser. A, Sept. 22, 1954, p. 478-504.

Measurements of effect of dissolved nitrocellulose on vapor pressure of acetone, five other aliphatic ketones, dioxane, ethyl *n*-propyl ether, acetonitrile and nitromethane. Tables, diagram, graphs. 46 ref.

1429* Fatigue of Metals and Plastics. N'ion. *Rubber and Plastics Age*, v. 35, Sept. 1954, p. 424-425.

Problem as related to failure in "Comet" aircraft crashes. Aspects are discussed separately. Photograph. 3 ref.

1430* Applications of Plastics in Chemical Plant. I. Coatings and Linings. V. Evans. *Rubber and Plastics Age*, v. 35, Sept. 1954, p. 430-431.

Phenol-formaldehyde, epoxy, PVC, and polyethylene. (To be continued.)

1431* Technology of Polyesters. II. Application Methods. J. R. Stevenson. *Rubber and Plastics Age*, v. 35, Sept. 1954, p. 437-438.

Covers casting, hand lay-up, gel time, pre-forming, curing, and dough mixing processes.

1432* The Polyvinyl Acetal Resins. W. T. Jones. *Rubber and Plastics Age*, v. 35, Sept. 1954, p. 443-445.

Adhesives, molding, PV butyral, wash primer, and lacquers. Tables. 4 ref.

1433* The Future for Rubber-Modified Styrene Molding Compounds. E. V. Hellyar. *Rubber World*, v. 131, Oct. 1954, p. 76-80.

Engineering design factors; applications. Photographs.

1434* (Plastic Coating.) **La plastication.** J. Cauchetier. *Soudure et Techniques connexes*, v. 8, nos. 7-8, July-Aug. 1954, p. 187-192; disc., p. 192-193.

Describes equipment and materials used for application of sprayed coatings. Photographs, drawings.

1435* Statistical Quality Control. II. The Normal Frequency Distribution. Robert S. Fay. *SPE Journal*, v. 10, Oct. 1954, p. 28-30, 42.

Basic principles of statistics applied to plastics. Graphs. 3 ref.

1436 The Degree of Polymerization and Its Distribution in Cellulose Rayons. I. The Nitration of Rayon With Minimum Degradation. II. The Relation Between the Nitrogen Content and the Intrinsic Viscosity of Cellulose Nitrate. W. G. Harland. *Textile Institute, Journal, Transactions*, v. 45, Sept. 1954, p. T678-T695.

Includes diagrams, tables, graph. 26 ref.

1437* (Polymerization of Cyclooctatetraene.) **Polimerizatsiia tsiklooktatetraena.** S. N. Ushakov and O. F. Solomon. *Zhurnal Prikladnoi Khimii*, v. 27, no. 9, Sept. 1954, p. 959-964.

Reaction rate and quantity of catalyst (metallic sodium). Bromination of polymer. Tables, graphs. 5 ref.

Books and Miscellaneous Publications

1438* Plastics Engineering Handbook. Society of the Plastics Industry, Inc., 813 p. 1954. Reinhold Publishing Corporation, New York. (TP986 So13s2)

Work of 20 subcommittees is reported in sections on materials and processes, design finishing and assembly, testing, and SPI standards.

1439 Plastics. From REPORTS ON THE PROGRESS OF APPLIED CHEMISTRY. p. 497-548. 1953. Society of Chemical Industry, London. (TP1 So13r)

Three papers on developments in Europe and U. S. Tables. 658 ref.

307 (molecular weights of polymers)
311 (cationic polymerization and related complexes)
312 (acrylic ester polymerization)
378 (polyvinyl chlor-acetate coatings)
630 (cable dielectric material)
791 (properties of polymer solutions)
1539 (welding of plastics)
1541 (welding of plastics)

POLLUTION AND WASTES

1440 Fundamental Research in Water Pollution Abatement at Mellon Institute. Richard D. Hoak. *American Iron and Steel Institute, Preprint*, 1954, 17 p. (TS300 Am35ta)

Factors involving the metals industry. 8 ref.

1441 The Determinaton of Polycyclic Hydrocarbons in Town Air. R. L. Cooper. *Analyst*, v. 79, Sept. 1954, p. 573-579.

Method, using chromatography and spectrophotometry, is accurate to ± 0.5 μg. in detection of 3,4-benzpyene. Spectra, graph, tables. 10 ref.

1442 Some Aspects of Air Pollution. Louis C. McCabe. *Anthracite Conference, Transactions, Lehigh University, Eleventh*, 1953, p. 37-41. (TN820 An86t)

Report on the topographical and meterological factors in considering sites for industry which may contribute to air pollution by fuel burning.

Pollution and Wastes

1443* A Slit Sampler for Collecting Air-Borne Microorganisms. Herbert M. Decker and Myrl E. Wilson. *Applied Microbiology*, v. 2, Sept. 1954, p. 267-269.

Description and operating characteristics. Photographs, graph. 4 ref.

1444* Streptococci as Indices of Pollution in Well-Waters. Walter Morris and R. H. Weaver. *Applied Microbiology*, v. 2, Sept. 1954, p. 282-285.

Study of efficacy of the streptococcus index as a substitute for or supplement to the coliform index. Table. 12 ref.

1445* (Problems of Removing Dust From Flue Gases and Dust Annoyance.) **Probleme der Rauchgasentstaubung und der Staubbelästigung.** R. Nagel. *Brennstoff-Wärme-Kraft*, v. 6, no. 9, Sept. 1954, p. 344-348.

Evaluation of different dust-removing systems and discussion of factors which determine content, ejection rate, and grain size of flue-gas dust. Graphs. 13 ref.

1446* Air Conditioning Peak Seen in 1963. J. R. Hertzler. *Electrical World*, v. 142, Nov. 1, 1954, p. 81-85.

Economic study. Graph, tables.

1447* (Contribution to the Study of the Problem of Removal of Dust From Cupola Gases.) **Contribution a l'étude du problème de dépoussiérage des gaz de cubilots.** Jean Prat. *Fonderie*, 1954, no. 104, Sept., p. 4147-4150.

Characteristics of cupola gases and suspended dusts. Tables, graphs, diagram.

1448* The Dilution Method for Industrial Waste Disposal. Hubert S. Kline and Joseph F. Fletcher. *General Motors Engineering Journal*, v. 1, Sept.-Oct. 1954, p. 38-43.

Regulated discharge of waste solutions solves stream pollution problem. Photographs, table, diagram. 2 ref.

1449 A Partial Chemical Analysis of Atmospheric Dirt Collected for Study of Soiling Properties. C. E. Moore, Robert McCarthy, and R. F. Logsdon. *Heating, Piping & Air Conditioning*, v. 26, Oct. 1954, p. 145-148.

Air samples collected over American cities analyzed for free C, silica, and mixed oxides. Diagrams, graphs, table, photograph.

1450 Guides in Dust Collector Selection. John M. Kane. *Heating and Ventilating*, v. 51, Oct. 1954, p. 77-82.

Basic data regarding equipment governs selection of proper dust collector for particular industrial process. Photographs, tables.

1451* Carbohydrates for Fermentation Industries. III. Chemical Examination & Saccharification of Sugarcane Bagasse. M. Damodaran and R. S. Dhavalikar. *Journal of Scientific & Industrial Research*, v. 13, sec. B, Aug. 1954, p. 556-560.

Constituent sugars, their extraction, identification, and determination; and the preparation of crystalline dextrose from the bagasse hydrolysate. Tables, chromatogram. 26 ref.

1452 Foreign Particles in Gases. Frank H. Slade. *Machinery Lloyd (Overseas Ed.)*, v. 26, Sept. 25, 1954, p. 71, 73-82.

Principles of gaseous suspensions. Equipment for purification and dust collection. Graphs, tables, diagrams.

1453* (Removing Dust in Industrial Plants.) **Entstaubung in Industriebetrieben.** K. Schroeder. *Metall*, v. 8, nos. 19-20, Oct. 1954, p. 784-785.

Electrical and mechanical methods of removing dust.

1454* Oil Reclamation and Waste-Disposal Facilities. W. L. Pursell and T. W. Ferguson. *Petroleum Engineer (Management Edition)*, v. 26, Oct. 1954, p. C25 + 6 pages.

Waste-treating facilities for petroleum refineries. Diagrams. 27 ref.

1455* Chemical Flocculation of Refinery Waste. Roy F. Weston and R. G. Merman. *Petroleum Engineer (Management Edition)*, v. 26, Oct. 1954, p. C35 + 11 pages.

Equipment and operating procedures. Tables, photographs, diagrams. 4 ref.

1456 Cut Smog While Saving Product. *Petroleum Processing*, v. 9, Nov. 1954, p. 1731.

Fume control at California Standard's truck loading stand in Los Angeles. Diagram.

1457* Sampling Instruments for Air Pollution Surveys. Leslie Silverman. *Public Health Reports*, v. 69, Oct. 1954, p. 914-924.

Equipment; principles; methods. Applications to field problems. Table. 5 ref.

1458 Control Toxic or Combustible Gases, Dusts, or Vapors. *Rock Products*, v. 57, Oct. 1954, p. 73, 79.

Correction of intermittent hazards to workmen from gases, vapors, or dusts by using portable ventilation. Photographs.

1459* Physical Behavior of Synthetic Detergents. I. Preliminary Studies on Frothing and Oxygen Transfer. William O. Lynch and Clair N. Sawyer. *Sewage and Industrial Wastes*, v. 26, Oct. 1954, p. 1193-1201.

Frothing of 11 trade syndets during sewage disposal. Greatest trouble is from slow O_2 exchange. Graphs, photographs, table. 13 ref.

1460* A Simplified Technic for Atmospheric H_2S Studies. Gerson Chanin, John R. Elwood, and Edward H. Chow. *Sewage and Industrial Wastes*, v. 26, Oct. 1954, p. 1217-1230.

Lead acetate treated tiles used to map air pollution in East San Francisco Bay Area. Photographs, table, maps. 6 ref.

1461* Pilot-Plant Studies of Refinery Wastes Treatment on Trickling Filters. Gordon E. Mau. *Sewage and Industrial Wastes*, v. 26, Oct. 1954, p. 1236-1254.

Describes joint operations at Coffeyville, Kan. Photographs, graphs, tables. 9 ref.

1462* Influence of Filter-Press Cake on Pineapple Yields and Soil Properties. M. A. Lugo-López, E. Hernández-Medina, H. R. Cibes-Viade, and J. Vicente-Chandler. *Soil Science*, v. 78, Oct. 1954, p. 257-265.

Data from two field experiments established on representative pineapple-growing areas to study the effect of diffeernt rates of filter-press cake and two levels of fertilizer on pineapple yields. Tables. 10 ref.

1463* (Sampling Dust With the Aid of a Soluble and Volatile Filter Paper.) **Staubprobenahme mit Hilfe eines löslichen und verdampfbaren Filterpapiers.** A. P. Avy. *Staub*, 1954, no. 37, p. 372-381.

Specifications on the production and use of above filters and on the treatment and evaluation of the filtered dust samples. Diagrams, graphs, micrographs. 2 ref.

1464* Instrumentation in Industrial Hygiene and Air Pollution Developed at the Environmental Research Laboratory. I. Field Sampling Instruments. Ross N. Kusian. *Trend in Engineering, (University of Washington)*, v. 6, Oct. 1954, p. 21-23.

Includes diagrams. 4 ref.

1465* Cincinnati's New Sewage Plant. David Backmeyer. *Water & Sewage Works*, v. 101, Oct. 1954, p. 423-429.

First of four required plants to meet Ohio River Valley Sanitation Commission standards. Photographs, diagram, table.

1466* Principles of Chlorine Gas Feeders. R. W. Pearce. *Water & Sewage Works*, v. 101, Oct. 1954, p. 450-457.

Application of Cl to industrial wastes. Photographs, diagrams, tables.

1467* The Future of Waterborne Wastes. Harry A. Faber. *Water & Sewage Works*, v. 101, Oct. 1954, p. 466-470.

Based on U. S. population and demands. Diagrams, graphs. 8 ref.

Books and Miscellaneous Publications

1468 Sewage, River Pollution and Trade Wastes. E. L. Streatfield. Paper from REPORTS ON THE PROGRESS OF APPLIED CHEMISTRY. p. 821-831. 1953. Society of Chemical Industry, London. (TP1 So13r)

Surveys world developments. 46 ref.

1469 Procedures for Analyzing Metal-Finishing Wastes. Metal-Finishing Industry Action Committee. 102 p. 1954. Ohio River Valley Water Sanitation Commission, Cincinnati. (TD897 Oh3pr)

Jointly tested and approved methods for cyanides and metals, adapted methods, and methods for over-all examination.

See also:
1568 (waste disposal in pulping industry)

RUBBER AND ELASTOMERS

1470 Evaluation of Chemical Protectants as Inhibitors of Ozone-Induced Degradation of GR-S. A. D. Delman, B. B. Simms, and A. R. Allison. *Analytical Chemistry*, v. 26, Oct. 1954, p. 1589-1592.

Relates viscosity change to actual O_3 degradation. Photographs, graphs, table. 8 ref.

1471 Dynamic Characteristics of Silicone Rubber. G. W. Painter. *ASME, Transactions*, v. 76, Oct. 1954, p. 1131-1135; disc., p. 1135.

Viscoelastic properties of silicone rubber under various conditions of strain, frequency, and temperature. Graphs, photograph, table. 8 ref.

1472* Resistant Rubbers & Elastomers. F. F. Jaray and A. E. Lever. *Corrosion, Prevention and Control*, v. 1, Aug. 1954, p. 344-348, 354; Oct. 1954, p. 477-480, 484.

Compounding and application of natural and synthetic rubbers as linings or coatings to prevent corrosion. Photographs.

1473 Factice: Name, Nature and Future. C. Falconer Flint. *India Rubber World*, v. 127, Oct. 2, 1954, p. 550-553.

Structure and uses in rubber compounding. Diagrams.

1474 Elastomers. Harry L. Fisher. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2067-2075.

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1475 Hard Rubber. Henry Peters. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2112-2113.

Review of accomplishments in 1952 and 1953 and the significance of patent interests. 67 ref .

1476 Effect of Sulfur and Accelerator Variation on Aging. William L. Cox and J. Reid Shelton. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2237-2241.

Effect on rate of oxidation of rubber stocks and deterioration of properties accompanying oxidation. Graphs, tables. 12 ref.

1477 Oil-Resistant Rubbers From 2-Methyl-5-Vinylpyridine. James E. Pritchard and Milton H. Opheim. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2242-2245.

Development of synthetic rubbers for application in aircraft and motor vehicles. Tables. 3 ref.

1478 Evaluation of Diene-Type Elastomers. M. Feldon, D. R. Hammel, and R. W. Laundrie. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2248-2260.

Polymers exhibiting minimum changes in properties at low temperatures and also posses good oil and solvent resistance characteristics. Tables, graphs. 13 ref.

1479 Morphological Studies of Reclaimed Elastomers. Ernst A. Hauser. *Journal of Physical Chemistry*, v. 58, Oct. 1954, p. 829-230.

A new method of dispersion. 10 ref.

1480* Breakage of Rubber-Filler Linkages and Energy Dissipation in Stressed Rubber. A. F. Blanchard. *Journal of Polymer Science*, v. 14, Oct. 1954, p. 355-374.

The stress-strain behavior of reinforced rubber in respect to softening with applied stress. Graphs, tables. 3 ref.

1481* (Wear and Slippage.) **Abrieb und Schlupf.** G. Ebert and V. Weidner. *Kautschuk und Gummi*, v. 7, no. 9, Sept. 1954, p. WT191-WT196.

Description of device for measuring wear of gliding rubber mixtures as functions of pressure, velocity of motion, and type of opposing material. Diagram, photographs, tables, graphs.

1482* (Basic Research on Rubber Dispersions.) **Grundlagenforschung auf dem Gebiete der Kautschukdispersionen. I.** (Viscosimetric Measurements.) **Viskosimetrische Messungen.** G. Hofmann. *Plaste und Kautschuk*, v. 1, no. 3, Mar. 1954, p. 63-65.

Determination of viscosities as a function of concentration, temperature, pressure, and time. Graphs, tables. 2 ref.

1483* (Polyisobutylene Rubber.) **Polyisobutylenkautschuk.** I. Michalowska. *Plaste und Kautschuk*, v. 1, no. 4, Apr. 1954, p. 86-89.

Source and composition of isobutylene; history of the methods of its polymerization; properties; uses. Tables. 11 ref.

1484* (An Attempt to Produce More Uniformly Vulcanizing Natural Rubber by Bacterial Treatment of Latex.) **Étude sur la préparation d'un caoutchouc naturel à vulcanisation plus uniforme, par un traitement bactérien du latex.** A. J. Kluyver and E. H. Houwink. *Revue générale du caoutchouc*, v. 31, no. 9, Sept. 1954, p. 717-723.

Fifteen bacterial strains were tested for their ability to decompose choline and colamine in different media. Photograph, diagrams, tables, graphs. 15 ref.

1485* (An Attempt to Apply Measurement of Dielectric Losses to the Study of Pure Gum Compound Ageing.) **Essai d'application de la mesure des pertes diélectriques à l'étude du vieillissement de mélange pure gomme.** P. Henri-Robert. *Revue générale du caoutchouc*, v. 31, no. 9, Sept. 1954, p. 724-727.

Includes table, graphs. 7 ref.

1486 Morphological Studies of Silicone Rubbers. Ernst A. Hauser. *Rubber Age*, v. 76, Oct. 1954, p. 74-76.

Morphology depends mainly on the surface composition of the polymer and its molecular wt. distribution. Photographs. 7 ref.

1487* The Shrinkage of Mold Cured Elastomer Compositions. A. E. Juve and J. R. Beatty. *Rubber World*, v. 131, Oct. 1954, p. 62-68.

Comparison of shrinkage of different compositions when vulcanized in a mold cavity, particularly the effect on shrinkage of different rubbers and different loading pigments at various concentrations. Tables, graphs, diagram. 6 ref.

1488* Tailoring of Silicone Rubber to Meet Electrical Requirements. M. G. Noble and D. A. Lupfer. *Rubber World*, v. 131, Oct. 1954, p. 71-75.

The effect of three silica fillers on electrical properties of silicone rubber compounds; the influence of curing and test conditions on electrical characteristics of two compounds. Graphs, tables.

1489* Biosynthesis of Rubber. James Bonner, Marion W. Parker, and Juan C. Montermoso. *Science*, v. 120, Oct. 8, 1954, p. 549-551.

Mechanism of rubber production in the living plant. 21 ref.

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1490 What Every Engineer Should Knok About Rubber. W. J. S. Naunton. 128 p. 1954. The British Rubber Development Board, London. (TS1890 N22w)

Objective is to give the reader a brief, but practical review of application and technology.

Rubber and Elastomers

1491 Rubber: Natural and Synthetic. H. J. Stern. 491 p. 1954. MacLaren & Sons, Ltd., London. (TS1890 St45r)

History; production; compounding; properties; derivatives; machinery; testing; analysis.

See also:
201 (rubber-bonded abrasives)
839 (Teflon for bearings)
1422 (torsion measurements on Buna)

SPACE HEATING AND CONDITIONING

1492* (A New Electrical Space-Heating Device.) **Ein neues elektrisches Raumheizgerät.** E. Frank. *Allgemeine Wärmetechnik; Zeitschrift für wärme- und Kältetechnik*, v. 5, nos. 5-6, 1954, p. 108-112.

Fast-heating light-weight, aluminum space heater. Diagrams, tables, graphs. 2 ref.

1493* (The Temperature-Tolerance Requirement in Air-Conditioning Plants.) **Die Temperatur-Toleranz-Bedingung bei Klimaanlagen.** Herbert Bock. *Allgemeine Wärmetechnik; Zeitschrift für wärme- und Kältetechnik*, v. 5, no. 7, 1954, p. 137-146.

Factors which influence the temperature, humidity, and air composition of air-conditioned rooms. Formulation of permissible tolerances. Tables. 4 ref.

1494* Air Ionization as an Environment Factor. J. C. Beckett. *Applications and Industry*, 1954, no. 14, p. 161-165.

Ions affecting health. Ion-controlled electric heaters. Graphs, diagram. 17 ref.

1495* (The Use of "Convector" Space Heaters.) **Die Anwendung von "Konvektoren"-Raumheizkörpern.** Frohburg-Nötzold. *Energietechnik*, v. 4, no. 8, Aug. 1954, p. 366-367.

Principles of space heating by convection discussed as a means of economizing in cast iron used for radiators. Diagrams.

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Balance of ions in ventilated air have a subtle but definite effect on human comfort. Methods required to maintain outdoor values. Photograph, diagram, graph. 17 ref.

1497 Wide Area, Low Velocity Air Diffusion. E. J. Kurek. *Heating and Ventilating*, v. 51, Oct. 1954, p. 85-89.

Development of principles of arrangements for introducing air through wide perforated areas at low injection velocity. Diagrams.

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Data to simplify selection of shell and tube condenser to remove heat from a refrigerant gas. Tables, graphs.

TEXTILES AND FIBERS

1499* Factors Affecting the Absorption of Disperse Dyes by "Dacron" Polyester Fiber From Aqueous Baths. J. J. Iannarone, Oleta S. Larson, and R. J. Thomas. *American Dyestuff Reporter*, v. 43, Sept. 27, 1954, p. P650-P655.

Studies of acetate-dyes in orthophenylphenol baths. Tables, graphs. 12 ref.

1500* Union Dyeing Blends of Wool and Synthetic Fibers With Water-Soluble and Disperse Dyes. *American Dyestuff Reporter*, v. 43, Sept. 27, 1954, p. P656-P672.

Studies to increase the applicability of certain wool-synthetic blends by determining principles of union dyeing which give good color fastness. Tables, graphs. 13 ref.

1501* The Pigment Binding Power of Textile Finishing Materials. Leonard Shapiro. *American Dyestuff Reporter*, v. 43, Oct. 11, 1954, p. P691-P696.

Evaluation of test methods. Effects of additives. Tables, graphs. 5 ref.

1502 Fibers. Joseph L. Vodonik, Robert S. Casey, and C. S. Grove, Jr. *Industrial and Engineering Chemistry*, v. 46, Oct. 1954, p. 2076-2083.

New finishes, coatings, treatments, and uses resulting from synthetic and cotton fiber research over past yr. Photograph. 77 ref.

1503* Thermodynamics of the Mechanical Properties of Cellulose Fibers. W. E. Roseveare and L. Poore. *Journal of Polymer Science*, v. 14, Oct. 1954, p. 341-354.

Force-temperature behavior of cellulose fibers interpreted in terms of mechanisms of stretching and mechanical properties. Graphs, diagram, table. 8 ref.

1504* ("Wolcrylon" Fibers.) **Wolcrylon-Faser.** M. Duch. *Plaste und Kautschuk*, v. 1, no. 6, June 1954, p. 134-135.

Spinning, properties, uses, and processing of plastic fiber alone and when mixed with other fibers.

1505 Weathering of Cellulose Acetate. Janette B. Reid. *Textile Institute, Journal, Transactions*, v. 45, Sept. 1954, p. T665-T677.

Uneven exposure of loom-state cellulose acetate fabrics to moisture condensation or to light causes weathering, which is revealed as a luster defect after delustering. Practical methods of avoiding or remedying this defect. Graphs, table. 6 ref.

1506* The Interaction of Hair Fibers With Alkali Bromide Solutions. W. S. Barnard, A. Palm, P. B. Stam, D. L. Underwood, and H. J. White, Jr. *Textile Research Journal*, v. 24, Oct. 1954, p. 863-881.

Interactions were studied by measuring the amounts of salt and water taken up from the solution. Graphs, tables, diagrams. 19 ref.

1507* Dyeing Wool-Synthetics Blends. Henry D. Grimes. *Textile World*, v. 104, Oct. 1954, p. 84-85.

Desired shades and blend percentages regulate dyeing procedures and types of dyes. Three methods outlined. (To be continued.)

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1508 Wool, Its Chemistry and Physics. Peter Alexander and Robert F. Hudson. 404 p. 1954. Chapman & Hall, Ltd., London. (TS1547 AL27w)

Presents the chemical, physical, and biological characteristics of wool with emphasis on diffusion processes and molecular adsorption.

1509 Non-Cellulose Textile Chemistry. F. O. Howitt. Paper from REPORTS ON THE PROGRESS OF APPLIED CHEMISTRY. p. 477-496. 1953. Society of Chemical Industry, London. (TP1 So13r)

Survey of progress in Great Britain and U. S. 303 ref.

1510 Fibre Science. J. M. Preston, editor. 2nd Rev. Ed. 421 p. 1953. The Textile Institute, Manchester. (TS1540 P92f2)

Seventeen papers on composition, chemistry, properties, and structure of synthetic fibers.

1511 Cellulose Textile Chemistry. A. E. Stubbs. Paper from REPORTS ON THE PROGRESS OF APPLIED CHEMISTRY. p. 458-476. 1953. Society of Chemical Industry, London. (TP1 So13r)

Review of recent developments in the bleaching, dyeing, and printing of cellulosic textiles. 174 ref.

See also:
1436 (nitration and polymerization of rayon)

WELDING AND JOINING

1512* (Use and Behavior of Inserts for Light Alloy Articles.) **Anwendung und Bewährung von Einsatzbüchsen "Inserts" bei Werkstücken aus Leichtmetall.** F. Walther. *Aluminium*, v. 30, no. 10, Oct. 1954, p. 417-421.

Discusses advantages, techniques, and strength of inserts for threaded joints in Al alloys. Diagrams, tables, graph, photographs.

1513 Results of Service Test Program on Transition Welds Between Austenitic and Ferritic Steels at the Philip Sporn and Twin Branch Plants. G. E. Lien, F. Eberle, and R. D. Wylie. *ASME, Transactions*, v. 76, Oct. 1954, p. 1075-1083; disc., p. 1083.

Relation of transition welds to their suitability and strength for high-temperature service. Diagrams, graphs, micrographs, photographs, table. 6 ref.

1514 Spot Welding of Tinplate. M. J. Richard and D. W. Petchey. *British Welding Journal*, v. 1, Oct. 1954, p. 433-440.

Longest electrode life was obtained with Cu-Cr alloy tips using short weld times, large included-angle cone tips, and low loads. Photograph, tables, oscillogram. 8 ref.

1515 A New Process of Stub Welding. W. P. van den Blink, E. H. Ettema, and P. C. van der Willigen. *British Welding Journal*, v. 1, Oct. 1954, p. 447-454.

Use of a semiconductor cartridge to start the arc and to determine the distance between the stud and plate. Diagrams, photographs. 3 ref.

1516 The Fusion Welding of Aluminium Alloys. Introduction. I. A Survey of Published Information on the Fusion Welding of Heat-Treatable Aluminium Alloys. H. E. Dixon. **II. Review of Published Information on Weld Cracking in Aluminium Alloys, With Particular Reference to Al-Mg-Si Alloys.** W. G. Hull and D. Adams. **III. Dilution and Uniformity in Aluminium Alloy Weld Beads.** P. T. Houldcroft. *British Welding Journal*, v. 1, Oct. 1954, p. 455-472.

Literature review and experimental study of factors influencing the welding process. Tables, graphs, diagrams, micrograph. 47 ref.

1517 Influence of Hydrogen, Oxygen, and Nitrogen Upon Formation of Hot Cracks in 18-8 Steel Welds. I-III. D. I. Medovar. *Henry Brutcher, Altadena, Calif., Translation nos.* 3369-3371, 38 p. (From *Avtomaticheskaya Svarka*, v. 6, no. 4, 1953, p. 3-23.)

Effect of gases on the structure and properties of welds in 18-8 steel. Diagrams, micrographs, graphs, tables. 35 ref.

1518* (New Method of Practical Testing for Checking the Quality of Spot Welding on Low Alloy Semihard Steels.) **Nuevo metodo de ensayo practico para la comprobacion de calidad de las soldaduras por puntos realizadas sobre aceros semiduros debilmente aleados.** P. Joumat. *Ciencia y técnica de la Soldadura*, v. 4, no. 18, May-June 1954, 5 p.

Twisting and shear testing method is described. Photographs, micrographs.

1519* (Metallographic Characteristics of Various Welded Joints.) **Particularidades metalograficas de diversas uniones soldadas.** José María Sistiaga. *Ciencia y técnica de la Soldadura*, v. 4, no. 18, May-June 1954, 6 p.

Microscopic study of fusion, resistance, cold-pressure, condenser, and discharge welded steel and non-ferrous metals. Micrographs. 9 ref.

1520* (Design of Welded Constructions.) **Proyecto de construcciones soldadas.** F. Koenigsberger. *Ciencia y técnica de la Soldadura*, v. 4, no. 18, May-June 1954, 7 p.

Discusses problems relative to preparation of pieces, assembling, welding, deformation, and reduction of stresses. Photographs, charts, diagrams.

1521* (Methods of Inspection and Testing Applied to the Examination of Welders.) **Metodos de inspeccion y ensayo aplicados al examen de soldadores.** A. Mateos and J. Franco. *Ciencia y técnica de la Soldadura*, v. 4, no. 18, May-June 1954, 16 p.

Describes tests to determine quality of work for the purpose of setting standards for welders. Tables, diagrams, photographs, micrographs.

1522* (Theory and Applications of Fusionless Welding.) **Teoria y aplicaciones de la soldadura sin fusion.** Alfred Dufner. *Ciencia y técnica de la Soldadura*, v. 4, no. 19, July-Aug. 1954, 4 p.

Principles of oxyacetylene and electric arc brazing. Micrographs, drawings.

1523* (Welding of Crack in Bottom of High-Pressure Boiler Drum.) **Zavarka treshchiny y dnishche barabana kotla vysokogo davleniia.** B. B. Solov'ev. *Energetik*, v. 2, no. 8, Aug. 1954, p. 9-11.

Prewelding treatment; temperature control methods. Graph, table, diagrams.

1524 Brazing and Grinding of Carbide-Tipped Tools. L. Fine. *Engineers 'Digest*, v. 15, Sept. 1954, p. 366-368.

Procedures for increasing service life and reliability of tools. Photographs, table.

1525* Resistance Welding Joins Tantalum to Itself and Other Metals. John D. Kleis. *Industry & Welding*, v. 27, Oct. 1954, p. 74-75, 106.

Techniques for producing sound joints. Photograph.

1526* Weldability of Copper-Base Alloys. *Industry & Welding*, v. 27, Oct. 1954, p. 86-90, 92.

Proper techniques far various alloys. Diagrams, table.

1527* Oxy-Acetylene Welding of Copper. *Industry & Welding*, v. 27, Nov. 1954, p. 47-49, 107-109.

Welding techniques, joint preparation, preheating, and metallurgical changes. Photograph, tables.

1528* New Inert Arc Welding Process Speeds Fabrication of Mild Steel. C. H. Jennings and H. J. Bischel. *Industry & Welding*, v. 27, Nov. 1954, p. 58-60, 63-65.

New coated wire electrode for use with A shielding. Photographs, table.

1529 Improved Rods and Techniques Overcome Crack Sensitivity in Magnet Steel Welds. J. J. Obrzut. *Iron Age*, v. 174, Oct. 28, 1954, p. 90-91.

Rod and coating compositions, requirements for welded electromagnets. Photographs.

1530* Rheology of Adhesives. II. (English.) D. Narayanamurti and Jagdip Singh Sodhi. *Kolloid-Zeitschrift*, v. 138, no. 2, Sept. 1954, p. 68-75.

Rheology of casein glues, including irreversible types as used in the wood working and plywood industries and the influence of various factors, like purity of the casein, addition of various chemicals, preservative treatment, etc. Graphs, tables. 17 ref.

1531 Titanium Brazing. II. *Light Metal Age*, v. 12, Oct. 1954, p. 28-29.

Structure of films formed on heated Ti, fluxing reagents, flow of brazing metals, and effects of heating variables. Table.

1532 Zinc Die Cast Threaded Fasteners. Ernest W. Horvick. *Materials & Methods*, v. 40, Oct. 1954, p. 110-111.

Design advantages and low-cost production result from process. Photographs.

1533* (Principles of Welding Cast Light-Metal Alloys.) **Grundlagen des Schweissens der Leichtmetall-Gusslegierungen.** E. Klosse. *Metall*, v. 8 ,nos. 19-20, Oct. 1954, p. 764-765.

Preparation and preheating. Principles of the chief methods of welding Al and Mg alloys. 1 ref.

1534* (Spot Welding of Non-Ferrous Metals.) **Punktschweissen von NE-Metallen.** R. Plöchinger. *Metall*, v. 8, nos. 19-20, Oct. 1954, p. 766-767.

Principles and factors to be considered in adapting steel spot-

Welding and Joining

welding equipment to non-ferrous metals and alloys. Diagram, photographs, table.

1535* (Study on Furnace Brazing of Aluminum and Light Alloys.) **Étude sur le brasage au four de l'aluminium et des alliages légers.** Roger Biais. *Métaux, Corrosion-Industries*, v. 29, nos. 347-348, July-Aug. 1954, p. 303-314.

Principles and specific problems. Micrographs, diagrams, tables. 9 ref.

1536 Stub-Ending Drill Collars by Electric-Arc Welding. W. S. Bachman. *Oil and Gas Journal*, v. 53, Nov. 1, 1954, p. 85-87.

Description of stub welding process. Welding techniques, preheat, stress relief after welding, and the design of the weld. Photographs, diagram, graph.

1537 Field Welding Heavy-Wall Vessels. F. A. Upson. *Petroleum Refiner*, v. 33, Oct. 1954, p. 117-120.

Difficulties encountered, precautionary measures, and methods in obtaining sound welds in heavy plate under field conditions.

1538* (Contribution to the Tensiometric Study of Adhesive Joining of Metals.) **Contribution a l'étude tensiométrique du collage des métaux.** Henri L. Rosano and G. Diehl. *Recherche Aéronautique*, 1954, no. 40, July-Aug., p. 41-49.

Study of differently treated duralumin surfaces. Effects of orientation, constraint, and geometry on joint strengths. Diagrams, table, photograph. 9 ref.

1539* (Welding of Hard Polyvinyl Chloride (PVC Hard).) **Schweissen von hartem Polyvinylchlorid (PVC hart).** *Schweissen und Schneiden*, v. 6, no. 8, Aug. 1954, p. 355-359.

Proposed standard for equipment, joints, and technique of welding hard PVC with gas, heating elements, heat impulses, friction, and high frequencies. Diagrams, photographs. 8 ref.

1540 The Properties and Uses of Metal Adhesives. R. A. Johnson. *Sheet Metal Industries*, v. 31, no. 330, Oct. 1954, p. 829-835, 841.

Types, methods of use, and applications. Tables, photographs, graphs, diagram. 12 ref.

1541* (Welding of Plastic Materials.) **Le soudage des matières plastiques.** P. Piganiol. *Soudrue et Techniques connexes*, v. 8, nos. 7-8, July-Aug. 1954, p. 177-184; disc., p. 184-186.

Structure and behavior of natural rubber, polysterene, polyethylene and Teflon. Comparison with welding of metals. Operating methods. Photographs, diagrams.

1542* (Studies on Argon-Arc Welding.) **Etudes sur l'arc électrique en atmosphère d'argon.** J. Brillie. *Soudure et Techniques connexes*, v. 8, nos. 7-8, July-Aug. 1954, p. 195-202; disc., p. 202-204.

High-speed photographic study. Applications of Nertalic process on Al, Cu, bronze, and stainless steel. Drawings, photographs.

1543* (Production of Coated Electrodes for Arc Welding.) **La fabrication des électrodes enrobés pour soudage à l'arc.** P. Ducornet. *Soudure et Techniques connexes*, v. 8, nos. 7-8, July-Aug. 1954, p. 219-222; disc., p. 223-225.

Briefly outlines modern production methods on research trends.

1544* (Strength of Welded Seams of Steel 40 Kh in the Case of Flash Butt Welding.) **Prochnost' svarnogo shva stali 40Kh pri stykovoi svarke oplavleniem.** N. A. Dmitriev. *Stanki i Instrument*, v. 25, no. 8, Aug. 1954, p. 25-26.

Effects of welding current and preliminary heat treatment on mechanical properties of Cr steel. Graphs, diagram.

1545 Arc Welding; Old Process Refined. C. H. Jenning and H. J. Bichsel. *Steel*, v. 135, Nov. 1, 1954, p. 84-85.

New coated electrode makes straight polarity operation possible. Photographs, table, graph.

1546* Induction Heating for Large Weldments. H. B. Osborn, Jr. and A. Lüthy. *Tool Engineer*, v. 33, Nov. 1954, p. 82-84.

Method provides proper control of heating before and after welding operations. Photographs.

1547* (Flash Welding, Utilizing High-Frequency Current and Anti-Oxidation Measures.) **Svarka oplavleniem s ispol'zovaniem t. v. ch. i iskusstvennoi zashchity ot okisleniia.** A. S. Gel'man. *Vestnik Mashinostroeniia*, v. 34, no. 8, Aug. 1954, p. 74-77.

Effects of current variables on weld quality. Tables, graphs, micrographs. 2 ref.

1548* (Heat Treatment of Welded Seams of Stainless Steel.) **Termoobrabotka svarnykh shvov merzhaveiushchei stali.** V. V. Chernyshev. *Vestnik Mashinostroeniia*, v. 34, no. 8, Aug. 1954, p. 83-85.

Effects of various heat treaments on corrosion resistance of welded Cr-Ni steels. Photographs, micrographs, table.

1549 New Ways of Automatic Arc Welding. T. B. Jefferson. *Welding Engineer*, v. 39, Nov. 1954, p. 36-39.

Techniques for increasing welding rates. Diagrams, photographs.

1550 Nitrogen for Tig Welding? T. B. Jefferson. *Welding Engineer*, v. 39, Nov. 1954, p. 43-45.

Tests indicate N may be suitable for gas shielded welding of Cu and other non-ferrous metals. Photographs, table. 6 ref.

1551 Metallurgical Aspects of Welding Precipitation-Hardening Stainless Steels. C. W. Funk and M. J. Granger. *Welding Journal*, v. 33, Oct. 1954, p. 496S-508S.

Response of welded joints to heat treatments and effects of such treatments and weld defects on mechanical properties. Graphs, tables, micrographs, photographs. 13 ref.

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1554 Flash Welding High Strength Alloy Steels. W. G. Fassnacht. *Welding Journal*, v. 33, Oct. 1954, p. 937-944.

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1555 Prediction of Angular Distortion Caused by One-Pass Fillet Welding. T. Kumose, T. Yoshida, T. Abbe, and H. Onoue. *Welding Journal*, v. 33, Oct. 1954, p. 945-956.

Experimental data on mild steel tee joints. Effects of plastic and elastic prestrain. Graphs, diagrams, photographs. 2 ref.

1556 Spot Welding Aluminum With Single Phase Equipment. J. W. Kehoe and D. R. McCutcheon. *Welding Journal*, v. 33, Oct. 1954, p. 966-986.

Schedule developed for four widely used alloys in 257 combinations of alloy and thicknesses with eight machine settings. Photographs, graphs, tables. 5 ref.

1557 Titanium and Zirconium. F. Hirschmann. *Welding and Metal Fabrication*, v. 22, Oct. 1954, p. 377-380.

Argon-arc welding of pure metals and their alloys. Diagrams, table, micrographs. 32 ref.

1558 The Spot Welding of Aluminum Alloys. H. E. Dixon. *Welding and Metal Fabrication*, v. 22, Oct. 1954, p. 384-387.

Machine developments and research progress. Table, graphs. 37 ref.

1559 Directory of Welding and Fabricating Equipment. IV. Metal-Arc Welding Electrodes. Cast Iron. *Welding and Metal Fabrication,* v. 22, Oct. 1954, p. 397-400.

Tabulated data on names and characteristics of British electrodes for welding cast iron. (To be continued.)

See also:
782 (testing weld deposits)
1064 (fatigue of bonded structures)
1065 (fatigue strength of riveted joints)
1088 (strength of splined joints)
1138 (how to rivet Ti)
1205 (growth of welded metals)
1248 (weld inspection)

WOOD AND FOREST PRODUCTS

1560 *British Paper and Board Makers' Association, Proceedings of the Technical Section,* v. 35, pts. 1-2, Feb. and June 1954, 354 p. (TS1080 P19p)

Twenty-one papers on papermills, paper properties, dyeing, sizes, quality of paper and board in relation to its usage. Photographs, graphs, tables, diagrams, micrographs. 59 ref.

1561* Electronics in the Pulp and Paper Industry. W. A. Messervey. *Engineering Journal,* v. 37, Sept. 1954, p. 1073-1080; disc., p. 1080-1081.

Electronic components in drives and paper machine instrumentation. Photographs, circuits, flowsheet.

1562* Investigations on the Viscose Process. II. (English.) Hannes Sihtola and Ermo Kaila. *Paperi ja Puu,* v. 36, no. 9, Sept. 1954, p. 341-343.

Chain length distribution in comparative degradation of cellulose at the cooking, chlorination, hypochlorination, and aging stages. Tables, graphs. 10 ref.

1563* Experiences With the P. F. I. Viscose Pilot Plant. (English.) Ø. Ellefsen and J. G. Gløersen. *Paperi ja Puu,* v. 36, no. 9, Sept. 1954, p. 349-362.

Results and discussions of the first experimental charges. Photographs, tables, diagrams, graphs. 7 ref.

1564* Instrumentation of the Kraft Recovery System. Steve Kennedy. *Paper Mill News,* v. 77, Oct. 9, 1954, p. 68-70, 72-73.

Step-by-step applications in the system. Diagrams.

1565* The 25 Year Demand for Pulpwood, Pulp and Building Boards. *Paper Trade Journal,* v. 138, Oct. 8, 1954, p. 14-18.

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1566* Continuous Production of Unbleached Neutral Sulphite Semi-Chemical. R. G. Knechtges. *Paper Trade Journal,* v. 138, Oct. 22, 1954, p. 32-34.

Processing details in pulping of aspen. Flowsheet.

1567* Economics and Engineering of Semi-Chemical Pulp Mills. D. G. Moon. *Paper Trade Journal,* v. 138, Oct. 22, 1954, p. 44-46.

Semi-chemical pulp mills can be built in smaller units and at low cost than chemical pulp mills. Table, flowsheets.

1568* Progress in Alkaline Pulping—1953. J. E. Stone. *Southern Pulp and Paper Manufacturer,* v. 17, Oct. 1, 1954, p. 50 + 8 pages.

Review of processing trends. Use of agricultural residues. Sulfate liquor cycle. Odor control. Stream pollution abatement. 198 ref.

1569* Problems Concerning the Sulphur in Sulphate Pulping. Terje Enkvist. *Tappi,* v. 37, Aug. 1954, p. 350-352.

Chemistry of lignins and S during sulfate digestion. 27 ref.

1570* Raw Materials for More Paper. I. *Tappi,* v. 37, Aug. 1954, p. 14A + 17 pages.

Reviews current practice and the application of pulping processes to new fibrous materials. Tables.

1571* A New Process for the Bleaching of Kraft Pulp With Sodium Peroxide. Willard F. Schroeder and John R. Seferian. *Tappi,* v. 37, Sept. 1954, p. 376-384.

Bleach response of Na_2O_2 in the last bleaching stage has been improved by acid post-treatment to the preceding hypochlorite stage. Tables, graph. 5 ref.

1572* Progress in Alkaline Pulping—1953. J. E. Stone. *Tappi,* v. 37, Oct. 1954, p. 70A + 11 pages.

Literature survey on expansion and modernization here and abroad, the cooking process, sulfate liquor cycle, stream pollution, and digester corrosion. 198 ref.

1573* Sulphite Spent Liquor. V. Equilibrium Distribution of Ammonium and Other Ions Between Cation Exchange Resins and Aqueous Solutions. V. F. Felicetta, A. E. Markham, and Joseph L. McCarthy. *Tappi,* v. 37, Oct. 1954, p. 431-436.

Evaluation of the distribution of ammonium ion between sulfite spent liquor or sulphurous acid solutions and several cation exchange resins, and of the calcium-hydrogen ion exchange process. Tables, graphs, diagram. 13 ref.

1574* (Chemical Composition of Holocellulose and Hemicellulose of Oak Wood Pulp and the Wood Pulp of Several Far Eastern Coniferous Varieties) **Khimicheskii sostav kholotselliulozy i gemitselliuloz drevesiny duba i nekotorykh dal'nevostochnykh khvoinykh porod.** A. F. Zaitseva and N. I. Nikitin. *Zhurnal Prikladnoi Khimii,* v. 27, no. 9, Sept. 1954, p. 965-974.

Yields obtained through chlorination and 3% alcoholic solution of monoethanolamine; sodium chlorite in acetic acid; barium salt. Tables. 16 ref.

Books and Miscellaneous Publications

1575 Cellulose and Cellulose Derivatives. Emil Ott, Harold M. Spurlin, and Mildred W. Grafflin, editors. v. V. 2nd Ed. Pt. I. 509 p. 1954. Interscience Publishers, Inc., New York. (QD321 Ot8c2)

Discusses cellulose in nature, cellulose chemistry, physics of cellulose fibers, and natural associated structures with cellulose.

1576 Pulp and Paper. Herbert F. Rance. Paper from REPORTS ON THE PROGRESS OF APPLIED CHEMISTRY. p. 439-457. 1953. Society of Chemical Industry, London. (TP1 So13r)

Review of developments in pulp and paper industries of England and U. S. 99 ref.

1577 The Story of Papermaking. Edwin Sutermeister. 209 p. 1954. S. D. Warren Co., Boston. (TS1105 Su83s)

General and non-technical approach to the paper industry, covering types of basic materials, pulping processes, bleaching, stock preparation, paper machines, coating, and finishing.

See also:
70 (forest management)
669 (paper economics)
803 (papermill controls)